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REUNION.

WHERE shall we meet who parted long ago?
The frosty stars were twinkling in the sky,
The moorland lay before us white with snow,
The north wind smote our faces rushing by.
Where shall we meet? On such a moorland lone?
In crowded city street, or country lane?
On sandy beach-walk, while the sea makes moan?
In quiet chamber? Shall we meet again
On any spot of old familiar ground,
Our childish haunts? or in a far-off land?
Ah me! what if on earth no spot be found
For longing eyes to meet, and clasping hand?
What then? — If angry fate reunion bars,
A better meeting waits beyond the stars.

When shall we meet who parted in the night?
At some calm dawning, or in noontide heat?
To-day? to-morrow? or will years take flight
Before our yearning hearts find welcome sweet?
When shall we meet? While summer roses lie
Beside our path, and rustle overhead?
Or later, when a leaden winter sky
Looks coldly on the empty garden-bed?
While youthful faith and hopefulness are ours?
Or only when our hair is growing gray?
Ah me! we may have done with earthly hours
Before it comes to us, that happy day!
What then? — Let life's lone path be humbly trod,
And where or when we meet, we leave to God.

All The Year Round.

LINKS TO THE PAST.

WHEN the first ripe blush of youth has vanished,
With its changing hue of hopes and fears;
When all memories of the past seem banished,
By the shadow of succeeding years:

When the loving heart, becoming colder,
Loses much of wonted faith and trust;
When, too, sorrow day by day grown older,
Half forgot lies trodden in the dust, —

How at such time will some little token,
Drawn by chance from some long-forgotten nook —
Mayhap but a flower all crushed and broken
Lying hid in some once-cherished book —

Stir again the icy heart to sadness,
Rouse once more the memories of the past,
Bringing mingled thoughts of grief and gladness,
Whisp'ring of the haven found at last.
Till at length from past to present waking,
Once again peeps forth a hopeful beam;
As full oft the sun through dull clouds breaking
Tints the autumn lands with ruddy gleam.

Quiver.

A RHYMER'S WISH.

WHEN death with no unwelcome touch
Shall free my weary sprite,
I would not be lamented much,
Nor yet forgotten quite.

Let art devise no sounding mask
Affliction's voice to aid;
The softest sigh is all I ask
To soothe my wistful shade.

The tribute of a silent tear
Would satisfy the claim
Of one who found few friendships here,
And never dreamt of fame.

No marble mound to load my breast
Should I arise to sue,
Would Love his constancy attest
With a fresh flower or two.

While Memory, from her grassy seat,
Might now and then incline
O'er the mute rhymster to repeat
A verse of his, — a line.

With such memorials to endear
Some lone, sepulchral spot,
I should not wake too sad a tear,
Nor yet be quite forgot.

Spectator. J. S. D.

AMONG THE VINES.

THE clustering vines spring up through the clear air;
They grow twice over; once, high up and green,
And once deep down in the blue lake, between
The purple mountains, — both alike so fair,
One scarce can tell the sunshine from the glare.
Here, the light ripples through a leafy screen,
There, it flows on all golden and serene,
In both the dark-eyed children stand and stare;
While up and down their weary parents pace
Those stony ways, with long, deep baskets slung
Over their shoulders; yet with easy grace
They bear their burdens, whether old or young;
For here they play at work — in many a place
They work at play — for those, no song be sung.

Spectator. H. A. DUFF.

From The British Quarterly Review.

SECULAR CHANGE OF CLIMATE.*

OF the many facts in physical geography which modern study has brought to light, none, perhaps, is more startling than the certainty that, in former ages, the climate of the earth has been very different from what it now is. Our forefathers had so accustomed themselves to the idea that the present is the natural order of things, that heat and cold are the essential and necessary characteristics of the tropical and arctic zones, that they received with incredulity the announcements of geological discoveries which seemed to speak of widely different conditions; and maintained that the remains of tropical beasts or plants found, as in our country, must have been carried there in some convulsion or cataclysm, probably by the great deluge itself.

This state of doubt, incredulity, and unbelief has long since passed away, and it is now well known, not only by professed students of geology and geography, but by the general reader, that from the earliest ages the climate, as well as the surface of the earth, has been subject to continual change. The knowledge, however, is a living reality to but few. The fossils of the coal-fields have indeed long accustomed the public to the idea of a period of great warmth, an idea accepted the more readily as in apparent unison with the received belief in the once molten state of the globe, which was thus supposed to have been still cooling down to its present temperature within comparatively recent times; but the idea of frequent alternations, of periods of great cold succeeding or preceding periods of great warmth, is one of which indeed many may have read or heard, but without, by any means, fully grasping the meaning of it.

In fact, the old notion, as formulated by Sir David Brewster, that temperature, and climate as depending on temperature, is a simple function of the latitude, has stood very much in the way, and has rendered it difficult for any more exact statement to win belief; so that even now the great difference between the climates of places on the same parallel, such as Labrador and England, is an every-day source of wonder and vague guessing. But the experience of modern geographers has shown that such irregularities are the rule, and the labors of geologists have proved that, in past ages, climate has varied and alternated in almost every possible way, from the poles to the equator. The geological record is in many places obscure, in many places altogether obliterated; but enough remains to establish the general truth of the proposition, and to propound it as a physical problem of no less interest than difficulty.

It is the interpretation of this record, the investigation of this problem, that the authors of the two works which we have named above have attempted. They have done so in a patient and earnest manner, searching after truth with a zeal that recognizes no hindrance, with a practised skill that luxuriates in difficulties; and they have given us books of an interest more thrilling than the most sensational tale of broken vows or violated commandments which has gone the round of the circulating libraries. Mr. Geikie's book, indeed, is principally historical or descriptive, and is eminently readable and intensely exciting; but Mr. Croll's will scarcely meet with such popular acceptance, for though its interest is, if possible, even greater, than that of the other, it bristles with facts, and arguments, and stern arithmetic, which will delight the earnest student, but will be as a quickset hedge from which the mere casual reader will turn in dismay. For such, the book does not profess to be written; and whilst we could call special attention to it, as well as to its fellow, as both requiring and deserving a careful examination, we think we shall be doing the world of letters good service in presenting to it some account of the subject-matter of these very remarkable works, whose publication may be said to mark a scientific epoch.

We would not, of course, be understood

* (1.) *The Great Ice Age, and its Relation to the Antiquity of Man.* By JAMES GEIKIE, F.R.S.E., F.G.S., of Her Majesty's Geological Survey of Scotland. 8vo. London. 1874.

(2.) *Climate and Time in their Geological Relations: a Theory of Secular Changes of the Earth's Climate.* By JAMES CROLL, of Her Majesty's Geological Survey of Scotland. 8vo. London. 1875.

to imply that the phenomena treated of in these works are now for the first time described and discussed. So far from this being the case, the outline of the facts has been before the public for more than thirty years, and their interpretation has been investigated by most of the leading geologists of Europe and America, and more particularly in our own country by Lyell, Ramsay, and Archibald Geikie, the elder brother of one of our present authors. But in the writings of all these, the subject of climate has been more or less subsidiary to some other principal design, an incidental episode or illustration in the body of some more general essay, and its details have not been worked out in a comprehensive and collected manner. In this sense "The Great Ice Age" and "Climate and Time" form the first complete exposition of these phenomena and their correlative theories, and have thus a distinct value, irrespective of the skilled labor and scientific acumen which have been brought to bear on the complex problems under consideration.

When the early dispute between the rival claims of fire and water began to die out, and the less sensational theory of Sir Charles Lyell made its way, geologists perceived that there were many facts which neither fire nor water, nor any other familiar agency, could explain; such, for instance, as huge angular boulders found many hundreds of miles from the place of their origin; heaps of rough stones or of dirt piled up or scattered about in situations where water could not have carried them; fixed rocks, smoothed, rounded, polished, and regularly scratched; or vast quantities of finely-ground and well-kneaded but unstratified clay intimately mixed up with stones scratched and polished as the rocks. And yet these appearances, common over the whole of northern Europe and America, are peculiarly so in our own country: the clay, especially, is a distinct geological feature of a great part of the Scottish lowlands, where it is known as "till," and of England, where it has been more commonly called "boulder clay;" but its characteristics are everywhere the same; it is a firm, tough, tenacious, stony clay, more objectionable to engineers than the hardest rocks. These phenomena were the subject of much debate: it was only by slow degrees that the prejudices of habit and of former modes of thought could be overcome, and it became recognized that ice was the one and only agent in nature which could give rise to them.

Long observation in Switzerland, where glaciers still exist, showed that the grinding and kneading of the clay is even now going on; that rocks are even now being smoothed, rounded, polished, and scratched; that irregular heaps of stones are being piled up as lateral or terminal moraines; and that enormous boulders are being carried far from their parent cliff. More exact observation showed that the glaciers of modern Switzerland are mere pigmies in comparison with those which must have existed long ago, and pointed out the moraines of the past, identical in fashion with those of the present, the rounded and scratched rocks, the transported boulders, and all the other marks which the modern glaciers could be seen duly registering. Here then was the key: the marks in England, in Scotland, in Denmark, in Norway, or Sweden, were identical with those found in Switzerland, and there clearly recognized as made by an extended system of glaciers. But it was difficult to believe that glaciers of a size at all adequate to produce the observed effects could ever have existed in this temperate and low-lying part of Europe; and even to those who were prepared to admit the effect of glacier action, there were many apparent contradictions which seemed to render the proposed theory untenable. Still, the enormous power of ice, both to carry and to grind, was generally admitted; and it was eagerly and positively maintained that the particular form of ice which had, in past ages, been at work in this part of the globe, was that of bergs borne on an arctic current.

This did not seem to involve any extreme change of climate. It was well known that on the other side of the Atlantic, bergs of an enormous size annually come down to a much lower latitude than ours, and that in the south they approach very near to the Cape of Good Hope.

There was, therefore, little difficulty in the way of admitting the possibility of icebergs coming out of the Arctic, and drifting on their way over such parts of this country as happened at the time to be under water. An able and popular writer enlarged on this idea a few years ago, in that most interesting work, "Frost and Fire," and argued that the precise track of these icebergs was over what is now Russian Lapland, then the bottom of the sea, down the Gulf of Bothnia, and so out over the submerged south of Sweden, Denmark, and England.

Plausible as Mr. Campbell's theory undoubtedly is, and though in many respects ingenious and suggestive, it is none the less founded on fancy rather than on observation, and has not stood the test of severe scientific scrutiny. Indeed, when such scrutiny is uncompromisingly carried out, it is found that there is no evidence at all showing that icebergs do or can smooth, round, polish, or even regularly scratch rocks over which they pass; there is no evidence at all showing, or tending to show, that they ever grind over rocks in such a way as to produce any of these effects in the very slightest degree. The evidence is indeed rather to the contrary, that they do not and cannot grind along the bottom; that they either float freely or bring up with a violent shock, that may smash, or contort, or plough up the bottom, but most certainly does not mark it with long series of fine scratches, or *striæ*.

These *striæ* are amongst the most common of ice-markings; they exactly resemble those now made by glaciers; they therefore may have been made by glaciers; and no other natural agent is known by which they can have been made. The necessary inference then is that they were made by glaciers; that the ice which has crushed and ground the surface of our country, not only on the mountains, but on the low lands, was land ice; and that therefore the climate of this part of the world was, at that time, such as to admit of land ice in very large masses. When the various glacial phenomena are examined step by step, in full detail, it is found that the action of land ice will explain them all, if only it can be supposed to have been in sufficient quantity; but the great difficulty has been in the conception of the enormous extent of ice which must have been at work. Glaciers, as ordinarily understood, are quite insufficient; and the idea, stupendous as it seems, which has been gaining ground, and which is now very generally held by all competent geologists, is that at the period of this world's history to which these glacial phenomena are to be referred, the whole adjacent surface of the earth was covered, to the depth of several thousand feet, with one solid mass of ice.

So far as Europe is concerned, the ice-cap extended over the greater part of Germany, Sweden, and Norway, the Baltic, Denmark, the North Sea, Great Britain and Ireland, and seaward for some distance into the Atlantic, where it terminated, probably near the present hundred-fathom line, in an ice wall or cliff, not unlike that now existing in the Antarctic Ocean. This is, in bare outline, the description of northwestern Europe in what is known as "the glacial period;" whilst further south and east the glaciers of the Alps, Apennines, and other mountain ranges, even as far as the Lebanon, had an exaggerated development. The condition of North America was similar: the ice-covering extended in one unbroken sheet as far as the parallel of 40°, and reached in exceptional though enormous glaciers to a much lower latitude.

The evidence however stands out very clearly that these masses of continental ice were not connected; that they were not parts of a huge ice-cap covering the pole, and stretching down to the parallel of 40° or 50°. The *striæ* left in the far north of Lapland lead down towards the Arctic Sea; those in the north of Scotland also lead north; those in the east lead east, towards the North Sea. It would appear that the bed of this sea was the low-lying part of the enormous glacier, slowly creeping north, and terminating beyond the Shetland Islands, in a continuation of the Irish ice-cliff. In the southern hemisphere the action of ice in a manner equally beyond present possibility is also well attested; though the comparatively limited area of land, and the relative scant-

iness of observation even over that limited area, prevent our attempting to trace its extent.

It is difficult to accept the idea of such a climatic condition, whether in the northern or southern hemisphere, an idea so utterly subversive of all preconceived notions. What! one might be tempted to exclaim, — England with a climate like that of Greenland! As well speak of Greenland with a climate like that of England. A climax of absurdity; and yet it is exactly this change which has taken place. We cannot get rid of evidence by, ostrich-like, ignoring it. The evidence of this remarkable change of climate is overwhelming, and though its extreme copiousness prevents our even attempting to recapitulate it, we may illustrate the general statement of fact by calling attention to some of its more salient features.

Glaciers, such as we now know them in Switzerland, may be properly called rivers of ice; they descend from the sides of mountains into valleys, and continue their course down the valleys until they reach their bounding limit. Whatever may be eventually proved to be the cause of the motion of glaciers, it is quite certain that the downward force of gravity plays an important part in it; hence, when blocks of stone fall on to, or become imbedded in, a glacier, they descend with it, and when left by the melting ice, are almost necessarily at a lower level than their origin. But the travelled blocks now found in many parts of Europe do not correspond to this condition: they are frequently found at a higher level, and in positions such that they must have passed over hill ranges of considerable altitude. Amongst these, special mention is made of a large mass of mica-slate, at a height of ten hundred and twenty feet on the Pentland Hills, which must have come from fifty miles to the north or eighty to the west. Boulders of highland rocks have been found on the northern slopes of the Lammermuir Hills, and on the crests of the hills between the valleys of the Clyde and the Irvine. These blocks passed not only over wide valleys, such as the Forth or Clyde, but over the Campsie or Orchil Hills; and if we admit that ice was the carrying agent, it is clear that the valleys must have been filled up, and the intervening hills buried in the one sea of ice which swept down from the highlands over the low country. And whilst the scratching, polishing, and rounding of rocks, everywhere noted, as well as the mingled and confused mass of ground clay and stones, may be considered as certain proofs of glacial action, the portage of these and many other boulders over vast distances, across wide valleys or even seas, and up steep slopes, is conclusive as to the stupendous size of the glaciers which performed the work.

The evidence of a once genial climate in the now ice-bound Arctic is equally conclusive. The readers of arctic voyages — and during the last twelve months they have been numerous — will be familiar with McClure's discovery of the remains of a forest of pine-trees on the northern shores of Banks Land, in latitude 74° 48m., three hundred feet above sea level. "From the perfect state of the bark," he wrote, "and the position of the trees so far from the sea, there can be but little doubt that they grew originally in the country." Many other instances have been noted; and though some eminent geologists, including the late Sir Roderick Murchison, have suggested the possibility of these trees having been drifted there, as perhaps from the mouth of the Mackenzie, such a supposition demands a sea nearly clear of ice, which would itself speak of a widely different climate.

But the tree found by Sir Edward Belcher, near the northern end of Wellington Sound, in latitude 75° 32m., and longitude 92° W., about a mile and a half inland, is conclusive against this supposition. It was unmistakably *in situ*, and was dug out of the ground, with the soil immediately in contact with its roots. When brought home, it was examined by Sir William Hooker, whose report is curious. "The structure of the wood," he says, "differs remarkably in its anatomical character from that of any other conifer with which I am acquainted." The peculiarity, described at great length, consists in the division of each concentric ring, or annual growth, into two zones, of which the inner, or first formed, "must be regarded as imperfectly developed, being deposited at a season when the functions of the plant are very intermittently exercised, and when a few short hours of sunshine are daily succeeded by many of extreme cold." In the outer zone, on the other hand, formed whilst the sun's heat and light are continuous throughout the twenty-four hours, the wood fibres are more perfectly developed than is usual in the natural order to which this tree belongs.

Of a much earlier age, but bearing evidence to a still milder climate, are the coal measures, which, as is well known, have been found in many parts of the arctic

regions, and notably in Melville Island, latitude 74°-76°; and corals, found, amongst other places, in Beechy Island. Almost still more startling are the ammonites, which have been found in great numbers, in widely different parts; by Lieutenant Anjou of the Russian navy, on the southern shores of New Siberia, in latitude 74°, and by Captain McClintock, at Point Wilkie in Prince Patrick's Land, latitude 76° 20m. These last were examined by Professor Haughton. "It appears to me," he says, "difficult to imagine the possibility of such fossils living in a frozen, or even a temperate sea. All idea of accounting for the occurrence of such remains by drift must be abandoned, as the fossils found by McClintock were unquestionably *in situ*, and it is impossible to evade the consequences that follow to geological theory from their discovery."

Equally strong is the evidence of a tropical or semi-tropical climate in England and the neighboring parts of Europe. The fossil remains of animals peculiar to tropical climates, huge carnivora — lions, tigers, spotted hyænas — which require not only warmth, but abundance of animal food; elephants, rhinoceroses, hippopotami, requiring warmth, water, and luxuriant vegetation; are sufficient proofs that our climate was not only warm, but was, for the time, permanently so. The suggestion that warm summers and cold winters permitted the alternation of animals and plants of tropical and arctic types, will not meet the consideration that beasts, such as the hippopotamus, could neither endure the winter cold, nor migrate, with the seasons, across the whole breadth of Europe; and that the amount of vegetable food requisite for these gigantic pachydermata, and for the herds which formed the sustenance of the carnivora, could not grow each year as the winter glaciers disappeared.

These extreme changes of climate have naturally been much discussed amongst geologists, and many widely different theories have been proposed as attempts to explain them. Many of these can be regarded only as guesses, which will not stand the test of exact reasoning; others again, although imperfect and not altogether satisfactory, must be accepted as having some foundation in fact. We propose to consider these theories in some detail, and more especially that which for the last eleven years has been associated with Mr. Croll's name.

The first of these theories to which we have to refer was, that different parts of space might have very different temperatures, and that in the onward march of the solar system the earth might successively arrive at spaces of excessive cold and especial heat. Now, beyond the mere fact that the passing through a cold part of space might lower the temperature of the earth, or passing through a hot part might raise it, it is quite clear that there can be no evidence in support of such a supposition. But, on purely physical grounds, the theory is untenable. The distinctive feature of the glacial period, as producing geological results, was not the cold, but the enormous quantity of snow, that is, of condensed vapor. When then there was snow, there must have been also vapor to condense; when there was much snow, there must have been much vapor, and much heat to make that vapor; and therefore, as Professor Tyndall has well shown, the glacial period, though a period of intense cold towards one or both of the poles, cannot have been a period of intense cold all over the earth. On the other hand, the warm arctic climate cannot have been caused by the general addition of some fifty or sixty degrees to the mean temperature; for such addition, affecting the intertropical as well as the polar regions, would have been fatal to animal and vegetable life. And again, as Mr. Croll has argued, since space, of itself, cannot be hot, any such hypothetical hot space must be in the neighborhood of some source of heat, some other sun, the attraction of which must necessarily have interfered with the orbital motion of the several members of the solar system.

A theory of a somewhat similar nature is that the sun has been of very variable magnitude, or that its heating power has been subject to excessive fluctuations. But the diminution of the sun's heating power, though of course it could produce a period of great cold, could not, as we have seen, give rise to a glacial period; and any great increase must, as before, have caused an alternation in the conditions of life, and have left behind it unmistakable proofs of its having occurred. We may therefore put these crude, unsupported, and unscientific fancies entirely out of the question, and pass on to the theory proposed by Sir Charles Lyell, and examined by him at considerable length in the later editions of his well-known works.

This would refer the changes of climate principally, if not altogether, to changes in the relative distribution of land and sea. Basing his argument on a remark of Humboldt's, that the climatic difference be-

tween North America and Europe was to be attributed to the American land reaching so much farther towards the pole, Sir Charles Lyell has maintained, with his usual clearness and copiousness of illustration, that an excess of land near the poles would give rise to a glacial condition; and that, contrariwise, an excess of land near the equator would occasion a sub-tropical climate all over the world. It is quite certain that changes in the distribution of land and sea must cause, and have caused, very different climatic conditions; it is also certain that, as a rule of the present time, land under the equator is hotter, land near the poles is colder, than the sea adjacent. But it is difficult to say how much of this difference is to be attributed to specially existing circumstances; and Humboldt's original idea of the cause of the rigor of the American climate, as compared with the European, cannot be accepted in this age of more exact geographical knowledge. It is beyond a doubt that the ocean currents and the winds which sweep over them are the cause of this present extreme difference, and it is logical to conclude that in any past age ocean currents must have contributed largely to the climatic conditions. But if at any time the intertropical area of the earth's surface was occupied almost entirely by land, no large current of intertropical water could have carried tropical warmth to temperate and arctic regions; and referring merely to our own present experience, the absence of such a current would be at once severely felt. We would therefore agree with Mr. Croll in the argument he has put forward, that marked as might be the effect of a redistribution of land and sea, it is extremely doubtful whether the particular form of redistribution suggested by Sir Charles Lyell could have led to the results which he has described; and that though the probability of great changes in the relative shape and position of the land must be taken into account, we can scarcely admit that such changes were principally and primarily the causes of the very great changes of climate testified to by the geological record.

A difficulty almost still more conclusive against our accepting this theory in its entirety, is that there is no reason to believe that there has been any such complete redistribution of the areas of land and sea during recent geological periods. There is, on the contrary, strong reason to believe that the present form of the oceans and continents, in its principal features, stretches very far into the past; and it is quite certain that the last glacial period was, geologically speaking, very recent — so recent, in fact, that it touched on the arrival of man in western Europe. Of the possible date of this we shall have to speak further on, but the evidence of man as absolutely contemporary with the reindeer in the south of France is very generally known.

The theory which would attribute the great changes of climate to great changes in the direction, or even in the being of ocean currents, has, during the last twenty years, been brought very prominently forward by many writers on physical geography; and very great weight is attached to it by Mr. Croll, whose investigations in connection with this branch of his subject have excited a good deal of scientific interest, and are now reproduced in a more connected form.

The simple fact of the existence of ocean currents, or what Captain Maury has aptly called "rivers in the ocean," is, of course, familiarly known; and of all the currents which traverse the ocean, none has been more frequently talked of and discussed than the Gulf Stream: if mere discussion could have arrived at any settlement of the questions respecting it, they must have been settled long ago. The facts about which there is no dispute may be briefly stated thus: —

A rapid current of warm water issues through the narrow passage geographically known as the Straits of Bemini, between Florida and the westernmost of the Bahamas, and follows very closely the coast of North America as far as the banks of Newfoundland. This current, coming out of the Gulf of Mexico, is called the Gulf Stream.

The surface water of the North Atlantic, about the latitude of 40°, is, on the average, much warmer than that of other oceans in the same latitude; and this unusual warmth stretches away towards the north and east, conveyed by a slow motion of the water, and reaches as far as the North Cape of Norway and into the Spitzbergen or Barentz Sea.

To the north-west of this area of warm water with a north-easterly set, is an area where the water is cold and sets to the southward, whether on the east coast of Greenland, or out of Baffin's Bay, or down the coast of Labrador; and this cold southerly current, with a very contracted breath, passes inside the Gulf Stream, and so washes the eastern coast of the United States.

Underneath the warm water, which on

the north-east is flowing northwards, is a bed of icy cold water, the coldest of which lies in certain deep channels between the Faroe and Shetland Islands. And, lastly,

A great part of the warm water of the North Atlantic sets southward, down the coast of Portugal and Africa, into the tropics.

These are the very bare facts, concerning which there is no doubt; but everything beyond — every attempt to connect these facts together, to form a reasonable system out of them, or to offer any scientific explanation of them — has led to controversy and discussion, and very unscientific assertion.

The disputants may, however, be perhaps fairly considered as resolving themselves into two classes; one of which, maintaining that there is no break of continuity or flow between the water which issues through the Straits of Bemini and that warm water which spreads over the middle latitudes of the North Atlantic, and passes to the north on the coast of Norway, or to the south on the coast of Africa, applies to the whole, collectively, the one title of Gulf Stream, and confers the name more distinctly on that northern part of it which passes into Barentz Sea; the other, holding that the Gulf Stream, as such, cannot be traced beyond the banks of Newfoundland, where its distinctively warm water has thinned out to the merest surface layer, and its velocity has died away, argues from familiar physical principles that the warm water of the tropical Atlantic and the cold water of the Arctic establish a circulation resembling, in its main points, that circulation which goes on through the pipes of an ordinary low-pressure hot-water warming apparatus; that, being such, the northerly flow of warm water along our coasts and the coast of Norway has no relationship to, and is quite independent of, the Gulf Stream; and that the name Gulf Stream applied to it is a geographical blunder and a physical misconception.

According to the first of these two classes the Gulf Stream is, in its origin, due to the trade winds, which drive the tropical surface water with considerable pressure into the Gulf of Mexico, from which it escapes through the Florida Narrows, as through the nozzle of a squirt, and is assisted by the prevailing south-westerly winds on the coast of the United States and by the strong west winds of the North Atlantic, known familiarly to seamen as "the roaring forties." These, it is argued, driving the water away from the American coast, call for a supply from behind. The so-called Gulf Stream is therefore strictly the continuous motion of the water that issues from the Florida Channel, maintained, supported, and strengthened by the persistent westerly winds of the North Atlantic, and divided by the pressure of the European coast-line, so that the northern part of it flows towards the north, the southern part towards the south; both of which branches are again still further supported by the winds of these regions, prevailing respectively from the south-west and north-west. That the water so driven under pressure into the Arctic should seek an escape as soon as, or wherever the pressure is withdrawn, is a necessary correlation; and in this sense the southerly flow of water down each coast of Greenland is a complement of the northerly flow on the west coast of Norway. It is argued also that the water so pressed towards the Arctic is more than can possibly get into that confined basin, and that thus a considerable portion of it, having lost its heat in high latitudes, is, as it has been called, banked down, and escapes as a southerly underflow of cold water.

This systematic explanation of the Gulf Stream in connection with the general circulation of the currents of the North Atlantic, seems to us satisfactory, not only in its broad outline, but in its more special details; whilst any theory which seeks to account for the existing state of oceanic circulation by reference to differences of temperature and density, falls far short of the geographical facts, and necessarily ignores the southerly currents on the coast of Greenland, or that grand southerly flow of water on the coast of Portugal and Africa. It is, at any rate, difficult for any one who has studied the subject of ocean currents as a geographer, and has based his theories on geographical observation, to admit the effect claimed for what he knows as paltry and uncertain differences of specific gravity; although such may arise from differences of temperature, if, indeed, they are not more than counterbalanced by differences of salinity caused by differences of evaporation.

It is, of course, easy to produce any wished-for effect, as a lecture-room illustration; but no theory can be accepted which is based on such, unless it can be shown that the conditions are similar, if not identical. Now, very great stress has been laid by those who have advocated the temperature theory, on the illustration shown by Dr. Carpenter; that is to say, on

the fact that by heating the water at one end of a long narrow tank, and by cooling that at the other, a vertical circulation can be established, a motion towards the cold end above, towards the warm end beneath. The conditions in such a tank and in the basin of the North Atlantic, of the small body of uniform water and the very large body of water of many diverse degrees of salinity, are too different to permit us to accept Dr. Carpenter's experiment as even an illustration of a theory of oceanic circulation, which, when applied to the geographical area, does not conform to observation, and does not explain existing facts.

An examination into the arguments which Dr. Carpenter on the one side, Mr. Croll and many geographers on the other, have adduced in support of their several views, would lead us into the recesses of a controversy unsuitable for this review. They will be found at length in the papers which Dr. Carpenter has contributed to the proceedings of the Royal Society or of the Royal Geographical Society, and in Mr. Croll's papers in the *Philosophical Magazine*, or more recently in his latest work, "Climate and Time," as well as in other writings to which he refers. For our present purpose it will be quite sufficient to say that on the main point of causation we agree entirely with Mr. Croll. We believe that not only the Gulf Stream and its various branches and ramifications, but the ocean currents generally, are due solely to the system of prevailing winds; not — as Mr. Croll has well specified — to winds in any one particular locality, but to the connected system of winds, which act in relation to each other, and transmit their pressure to the surface of the sea through wide extents of ocean.

Now it might be considered that the theoretical explanation of ocean currents has little to do with the question of climatic change, and that the bare fact of their presence or absence is all that we are now concerned with. This is not the case; for it is clearly difficult, if not impossible, to say whether, in the distant past, warm or cold currents did or did not, might or might not, traverse certain seas, unless we have a correct understanding of the forces which call them into being and direct their course. Dr. Carpenter, for instance, has maintained that the effect of the Gulf Stream upon the climate of this country is imperceptible. On the other hand, an American writer, Mr. Silas Bent, came before the transatlantic public some few years ago with a proposal to cut, through the Isthmus of Panama, a passage sufficiently large to allow the water forced into the Gulf of Mexico to escape into the Pacific, with the avowed intention of ruining this country as the commercial rival of the United States. Bent's proposal was so utterly absurd from an engineering point of view, that it escaped the notice due to it as a study in morality: but nevertheless, believing as we do that the Gulf Stream exercises a most direct and important influence on our climate, we believe that the submergence of Central America to such a depth as to permit the tropical waters driven by the trade winds to pass through into the Pacific, would produce a disastrous effect on the climate of north-western Europe; that glaciers might again flow down the valleys of Scotland, of Westmoreland, or of Wales; and that our harbors might be closed each winter with impenetrable ice: whilst Dr. Carpenter, believing that the warm current which passes to the north is quite independent of the Gulf Stream, and is the necessary circulation of tropical and arctic water at different temperatures, believes also that such a submergence of Central America would in no way interrupt this circulation, and would be to us a matter of little or no consequence.*

Similarly, he believes that the circulation would go on irrespective of other changes in the formation of the land, and that therefore oceanic currents cannot play any important part in the history or theory of the climatic changes of the past. It is on this account that Mr. Croll has devoted a very considerable portion of his work to the examination of different theories of ocean currents, arriving, as we have already said, at the conclusion that the circulation supposed to be due to differences of temperature does not exist — we would rather say, is insensible — and that the currents are due solely and entirely to the prevailing winds.

Believing then in the extreme importance of ocean currents as agents of climatic change, Mr. Croll has attempted to calculate their actual effect under present existing conditions. The labor of this calculation must have been very great, and we are by no means sure that its value is commensurate; for, with all possible care, the data are so very uncertain, that the results cannot be depended on as even approximately correct. The utmost we can allow is that they dimly shadow out the nature of the effect, and it is only with this comprehensive limitation that we accept them.

* *Contemporary Review*, March, 1871.

Very different estimates have been formed of the quantity of water which passes through the Narrows of Bemini. Anxious to avoid any charge of exaggeration, Mr. Croll has accepted the lowest: he assumes that 459 cubic miles of water pass through every day. He further assumes that the mean temperature of this mass of water as it passes through the straits is 65° F., and that the mean temperature of the same water as it returns south is 40° F. These estimates are purely hypothetical. Certainly very much of the water in the straits has a temperature far higher than 65°, and much of that which returns has a temperature far lower than 40°. As before, Mr. Croll purposely understates his case, and concludes from these data that the water projected each day into the northern part of the North Atlantic loses there twenty-five degrees of its temperature; that is to say, each cubic foot loses upwards of one thousand five hundred units of heat,* and the total loss in these units is somewhat more than one hundred thousand billions.

Such a number is, of course, only useful for purposes of arithmetic, as affording a means of comparison with other numbers equally beyond our powers of conception. It enables us to compare the quantity of heat so thrown off by the Gulf Stream with that received directly from the sun. It shows us that, according to the calculations and experiments of Herschel, Pouillett, and Meech, the quantity of heat so carried into our temperate regions by the Gulf Stream in one year is equal to that received directly from the sun over an area equal to the fourth part of the North Atlantic north of the Straits of Florida. The heat thrown off by the Gulf Stream in temperate latitudes is therefore equal to one-fourth of that supplied directly by the sun, and constitutes one-fifth of the whole heat of this vast area of the Atlantic.

Having arrived at this relative value of the heating power of the Gulf Stream, he next endeavors to form some idea of its absolute value by calculating the whole effect of the sun. The method which he follows is undoubtedly correct, though the results he obtains are so startling, that we cannot be surprised that both method and results have been controverted and denied.

The temperature of space is, according to Herschel and Pouillet, about 239 degrees below the zero of Fahernheit, and to this, if the sun were extinguished, they believe the temperature of the earth would rapidly sink. The mean annual temperature of the North Atlantic, north of the tropic, may be taken as 56° F.; the whole effect of the sun on the water of the North Atlantic is, therefore, fifty-six degrees more than 239, or 295 degrees; but we have just seen that one-fifth of this is imported by the Gulf Stream: it follows, therefore, that the stoppage of the Gulf Stream would withdraw fifty-nine degrees, and reduce the mean temperature of the North Atlantic below zero.

Now, although we cannot attach any idea of exactness to this calculation of the effect of the Gulf Stream, we do believe that it shows more correctly than any previous attempt the enormous influence which that current has on our climate. It shows how important must be the general action of ocean currents, and leads us directly to the consideration of the great currents in other parts of the world. None of these have been examined with that care which has been bestowed on the Gulf Stream, and the conditions of their origin render it impossible to form even the roughest estimate of their volume. The Japan Current in the North Pacific corresponds in many respects to the Gulf Stream, but there are no observations which enable us to say whether its volume and mean temperature are greater than those of its counterpart, or are less. It is nowhere confined in a narrow channel, where its dimensions can be, however rudely, measured; its surface flow is intermittent, and it has not yet been discovered what becomes of it during the month of February, when it disappears from the coast of Japan. The general impression amongst geographers is that it is altogether less than the Gulf Stream, and, compared with the larger area of the Pacific, there is little reason to doubt that it is so: still, its climatic effect is unquestionably very great.

The currents which, in the southern hemisphere, correspond to these, are small, in both the Atlantic and Pacific, and their volume and temperature insignificant in comparison. The only current of any note which flows from the tropics into the Southern Ocean is that which escapes from the Indian Ocean along the coast of Natal, and its waters are almost entirely spread out and carried away to the eastward by the prevailing drift: being thus dispersed, it has little direct influence

* A unit of heat is the quantity of heat necessary to raise the temperature of one pound of water by one degree Fahrenheit.

on the climate of any of the southern lands.

Small, however, as the heat-bearing currents of the southern hemisphere are in comparison with those of the northern, it is quite clear, by reference to the calculations which have been made as to the effect of the Gulf Stream, that they must exercise an important influence on the southern climate, and that if they were altogether withdrawn, the climate of the higher latitudes of the southern hemisphere would be very much worse than it even now is. If, for instance, the whole of the tropical drift to the southward of the line was to be pressed to the northward, the climate of the southern hemisphere would become much more severe; whilst at the same time the volumes of both the Gulf Stream and Japan Current would be much increased, and the northern hemisphere would be made much warmer. And conversely, if all the warm currents were driven to the south, then the northern hemisphere would have a glacial climate, and the southern a mild and warm one.

Now the median line between the northern and southern trade winds, which is also the median line of the equatorial drift, is undoubtedly coincident, or nearly so, with the line of greatest heat. When, therefore, one hemisphere is chilled and the other warmed, so that this line of greatest heat (thermal equator) passes far into the warmer hemisphere, the middle line of the equatorial drift, and the main body of the equatorial drift with it, passes also into the warmer hemisphere; and the volume of the warm currents of the warm hemisphere is increased, and that necessarily at the expense of the cold hemisphere. There is thus a tendency for the warm hemisphere to increase its warmth, and for the cold one to become more cold.

Mr. Croll explains this tendency by reference to a supposed increase of the strength of the trade winds in the colder hemisphere; but this seems at least doubtful. We would agree with him as to the effect produced, but would attribute it, rather, to the movement of the thermal equator; and we may support our objection by the evidence of the existing condition in the Pacific Ocean. Over none of the intertropical seas are the trade winds so irregular and uncertain as over the South Pacific; but the thermal equator is some 3° or 4° to the north of the line, and undoubtedly a great part of the equatorial drift passes into the northern hemisphere.

But in connection with this, there is one important point on which Mr. Croll has scarcely laid sufficient stress; and that is the effect, on this interchange of currents, of even comparatively slight alterations in the form of the land. We have already referred to the possible effect of an alteration so slight as the submergence of Central America: the submergence of the low land of South America would produce a much greater. Notwithstanding the present position of the mean thermal equator some 5° to the north of the line, it is quite evident that the main cause of the intrusion of so much of the equatorial drift into the North Atlantic is rather the position of Cape St. Roque and the general lay of the coast of South America. Cape St. Roque is in latitude 5° 10m S., and intercepts a considerable part of the north-westerly drift of the South Atlantic. It is quite clear that, when once caught, this has no escape to the southward, but must go north towards the Caribbean Sea. Similarly, all the water that, during a great part of the year, is pressed up against this coast-line by the north-east trades, is also compelled to go towards the north-west. But if this coast-line did not exist, if the plains of the Orinoco, the Amazon, and the Paraguay were at the bottom of the sea, — and it is certain they were there at no very distant geological period, — this restraint on the equatorial drift would no longer exist, and the greater portion of that heated water which now flows into the Gulf of Mexico would, beyond doubt, be pressed to the south, warming the southern hemisphere at the expense of the northern.

In the same way a slightly different arrangement of the islands in the west of the Pacific, the line of which now slopes away towards the north-west, and forces a great part of the equatorial drift to the north as a supply to the Japan Current, would either divert it to the south, or would permit it to pass through into the Indian Ocean, and so increase in volume and in heating power the current of the coast of Natal. The effect of these changes cannot, of course, be calculated: they might vary in intensity; they might be whole or partial. All that we can say is, that having attempted to calculate the effect of the Gulf Stream, and, whilst fully acknowledging the roughness and imperfection of that calculation, having convinced ourselves of the enormous climatic influence of that current, we are able to form a shadowy idea of the possible effect of other currents which might, under different conditions, flow in very different directions; and we arrive necessarily at the conclusion

that the ocean currents are a most important cause of the conditions of climate now existing, and, changing in magnitude and direction obedient to changes in the coast-line, in the thermal equator, and in the prevailing winds, must have been so ever since the world began.

But Mr. Croll, admitting the very great influence of ocean currents on climatic conditions, and arguing most ably on their causes and changes, has considered them throughout as secondary to cosmical changes, changes, that is, in the earth's orbit and position at different seasons relative to the sun. His theory on this point is entirely his own; and though, during the ten or twelve years which have passed since he first broached it in the *Philosophical Magazine* it has been much discussed, it has continually gathered strength, and is now very generally accepted as an extremely probable solution of the many difficulties involved in the question of climatic change.

From the days of our childhood, we, dwelling in the northern hemisphere, have been familiar with what then seemed the startling fact that the earth is nearer the sun in winter than in summer; and that winter and summer depend not so much on the lesser or greater distance from the sun, but on the degree of the divergence of the sun's rays from the perpendicular. We learnt, in fact, the meaning of the terms "tropics," "arctic," and "antarctic;" and, in all probability, learnt also many climatic rules which we have been now proving to be erroneous. We therefore refer to this early instruction in the use of the globes only to remind our readers that the northern winter now occurs when the earth is nearest the sun, the southern winter when the earth is farthest from the sun. The difference between the two distances, the nearest and the farthest, is at present about one-thirtieth of the mean distance, or three million miles; but it is subject to continual though exceedingly slow change, and may increase till it is rather more than fourteen millions of miles, or between one-sixth and one-seventh of the mean distance. At the present time, the hemisphere which is nearest the sun in winter has a winter eight days shorter than its summer; at the time of the greatest difference just spoken of, the winter would be thirty-six days shorter. Now it might well be supposed that a difference of even eight days between the length of summer and winter, and much more a difference of thirty-six days, would make a very great difference between the warmth in summer, or the cold in winter, of the two hemispheres. It might well be supposed that the hemisphere whose summer was eight days longer than the other would be the warmer in that proportion, and still more when the summer was thirty-six days longer.

Accordingly, no sooner was it shown from geological evidence that the earth had been subject to very great changes of climate, than the idea was started that these changes were due to corresponding changes in the shape, or, mathematically speaking, the eccentricity * of the earth's orbit; and to there having been, at some former time, this great difference in the length of summer and winter. But it was shown by physical reasoning from observed facts — we may say that it was satisfactorily shown — that notwithstanding this great difference, and whatever the difference between the length of summer and winter, the quantity of heat received from the sun in the course of the year by each hemisphere was exactly and always the same; from which fact it was argued that any climatic difference in the two hemispheres, either from each other or from a fixed mean, could not be due in any way to such a change in the orbit of the earth.

Sir John Herschel, indeed, as far back as 1830, was inclined to believe that these differences might give rise to remarkable changes of climate, but he would appear to have been dissatisfied with the evidence to that effect; and in the early editions of his "Outlines of Astronomy" he taught that since the quantity of solar heat received by the two hemispheres was the same, the effects which might arise from the difference of distance and of the length of the seasons would be counterbalanced. In the fourth edition, published in 1858, he considerably modified this opinion, and wrote that, on the supposition of a very great eccentricity of the earth's orbit, other things remaining the same, in the northern hemisphere "we should have a short but very mild winter, with a long but very cool summer; while the southern hemisphere would be inconvenienced, and might be rendered uninhabitable, by the fierce extremes caused by concentrating half the annual supply of heat into a summer of very short duration, and spreading the other half over a long and dreary

* An ellipse is described on paper by drawing a pencil along in the bight of a string, fastened at the two ends to pins firmly driven in. The distance between these two pins as compared with the length of the string is the *eccentricity* of the ellipse.

winter, sharpened to an intolerable intensity of frost, when at its climax, by the much greater remoteness of the sun."

This, then, may be considered the most advanced view of the effect of the changing eccentricity of the earth's orbit previous to Mr. Croll's taking up the subject in 1864. Accepting Sir John Herschel's views of the perpetual spring climate of the hemisphere whose midwinter occurs when the earth is nearest the sun (*in perihelion*), Mr. Croll dissents altogether from the opinion that the other hemisphere will have a climate of violent contrasts; an intensely hot, almost unendurable summer, contrasted with a winter as intensely cold. His argument amounts to this: that during the long, cold winter of a period of maximum eccentricity, all the precipitation over that hemisphere would be in the form of snow; that this snow would lie unmelted, and would cover the surface of the ground at the commencement of the short summer; that the summer sun shining on this snow-clad surface could not warm it, but that a great portion of the heat rays would be reflected back into space; and of those rays which were not so reflected, the effect would be to convert some of the snow into water or vapor; the vapor so formed, being partially condensed by the neighborhood of vast masses of snow, would hang in the air as cloud and fog, and in great measure shut off the heat of the sun from the surface of the earth, or rather of the snow which covered it.

He considers that we have a feeble analogy to this in the existing state of things in the southern hemisphere, in which, according to Sir James Ross, at the comparatively low latitude of 59°, in longitude 171° E., snow was falling on the longest day, and during the month of February (the month corresponding to August in the northern hemisphere) there were only three days free from snow-showers. More recently Captain Nares has given evidence to the same effect. He says: "Whilst in the neighborhood of the ice, between the 13th and 25th February, the temperature of the air ranged between 34·8° and 21·5° F., the mean being 31·5°; a slightly colder climate in an average latitude of 64° S. than is found in the month of August in the Arctic seas, in latitude 74° N." *

In the same strain Mr. Croll argues that the cold of Greenland and other arctic countries continues during the summer, not from the absence of heat, but because the snow-covering prevents the earth's receiving it. During the early summer fogs are extremely frequent, shutting off a great part of the sun's rays, and those which reach the earth do not warm the surface. He adduces on this point the evidence of Captain Scoresby, that the general obscurity of the atmosphere arising from fogs or clouds is such that the sun is frequently invisible during several successive days; and snow is so common in the arctic regions, that it may be boldly stated that, in nine days out of ten during the months of April, May, and June, more or less falls. Other arctic voyagers have given the same testimony. We will only add that from the latest voyage of which a report has been published, the cruise of the "Tigress" in 1873. "At 10 o'clock," writes Lieutenant-Commander White, "on the morning of Sunday, the 10th of August, the ship was brought to anchor in the harbor of Upernivik. A dense snow-storm lasted the entire day, making the country look all the more dreary for its new, fresh covering. From this time forward, snow-storms, storms of sleet, and a sort of frozen fog, were not unfrequent." *

This snow, this fog is, according to Mr. Croll, due entirely to the snow-covering of the surface; for the quantity of heat directly incident from the sun, during the long summer days, is very great, greater even than at the equator. Even as to momentary effect, a thermometer exposed to the direct radiation of the sun will stand at 100° F. or upwards, although the temperature of the surrounding air is below freezing point; and it is well known that, whilst snow and ice are lying in the immediate neighborhood, the pitch of a ship's seams will melt, or the black paint blister in the sun.

Mr. Croll's argument, then, amounts to this: that the present summers of Greenland and the Arctic are cold by reason of snow. "If," he says, "by some means or other we could remove the snow and ice from the arctic regions, they would then enjoy a temperate, if not a hot, summer. In Greenland snow falls even in the very middle of summer, more or less, nine days out of ten; but remove the snow from the northern hemisphere, and a snow-shower in Greenland during summer would be as great a rarity as it would be on the plains of India."

* Reports, etc., of H.M.S. "Challenger. No. 2, p. 10.

* Proceedings of the United States Naval Institute, vol. i. p. 41. 1875.

If we agree with Mr. Croll in this view of existing conditions, it follows that if, in any locality, the snow of winter does not melt during the summer, the climate of the locality is deteriorated; a continually increasing quantity of snow will be left each summer, and by degrees the whole face of the country will be covered. Now the eccentricity of the earth's orbit changes very slowly, and any climatic change resulting from it alone would come on also very slowly. The accumulation of snow might go on for thousands and thousands of years, and might, it will be evident, reach almost any conceivable extent.

But the climates of the two hemispheres during a point of maximum eccentricity would be extremely different, and, so to say, complementary. That hemisphere whose winters occurred at or near the time of the earth being in perihelion would have a mild and equable climate; winters warm, with little or no snow, by reason of the nearness of the sun; summers temperate, by reason of the distance, but not cold, because there would be no snow-covering to melt away. The precipitation might be great, but if so, it would be as rain; and the condensation of vapor into rain sets free vast stores of latent heat. A climate of extreme rain is, as far as the thermometer is concerned, necessarily mild; and the vegetation of a country depends rather on the minimum temperature than on the mean. We are all familiar with the damage often done by a frosty night in May; and the effect of three such nights on the vineyards of the south of France was brought tangibly home to many of us, some four years ago, by a considerable advance in the market price of Bordeaux wines. It is thus an equable climate, in which such minima are unknown, that is most favorable to vegetation; and even now, the vegetation under the most thoroughly wretched climate on the whole earth, in Tierra del Fuego, is almost tropical in many of its characteristics. But whilst one hemisphere would have a climate thus favorable to vegetation, equable and warm, the other would be subjected to the extreme rigor of cold; the snow-covering would reach far into the temperate zone, and the whole hemisphere would be chilled.

In so considering the changes of climate, there is then another astronomical condition, no less important than the eccentricity of the orbit, and that is the position of the earth in its orbit during the summer and winter halves of the year. At the present time the line which joins the positions of the earth at midsummer and midwinter is very nearly, though not quite, coincident with the greatest diameter of the earth's orbit, and midsummer and midwinter fall very nearly at the time at which the earth is respectively at its greatest and least distance from the sun — in astronomical language, when the earth is in aphelion and perihelion. Now this line continually changes its position, by virtue of a movement due, for the most part, to what is known as "the precession of the equinoxes." It turns slowly round the sun, and makes a complete circuit in rather less than twenty-one thousand years; that is to say, in about ten thousand years the position of the earth relative to the sun at midsummer and midwinter will be exactly the opposite of what it is now. Our midsummer will be when the earth is in perihelion, our midwinter when the earth is in aphelion; our winter will be about eight days longer than our summer, and the difference arising from this cause, such as it is, will be in favor of the southern hemisphere, as it now is in favor of the northern. But the same continual movement, the same precession of the equinoxes, goes on independently of any change in the eccentricity of the earth's orbit; and it may thus have happened that, during a period of maximum or very great eccentricity, the earth might be in both these positions, and, at intervals of some ten thousand years, both northern and southern hemispheres each be subjected to an extreme state of glaciation and to the very opposite conditions of a sub-tropical climate.

Amongst the many objections which have been made to this theory, there was one pointed out by Sir Charles Lyell, which cannot be overlooked. It amounts to this: that in this, as in other meteorological phenomena, the maximum effect would not be coincident with, but would follow at some distance, the maximum cause. The greatest accumulation of snow on the hemisphere supposed to be glaciated would not be when midwinter fell when the earth was in aphelion, but, rather, towards the end of the period during which the winters were longer than the summer, that is, as the earth at midwinter approached the point of quadrature. Now, in the gradual change of the earth's position, the accumulation of snow must take as long to disappear as to collect; and if the accumulation went on through the whole period during which the winter was longer than the summer, the removal

of this accumulation would last through the whole complementary period, and begin again at the end of it. In this way each hemisphere would be subjected to continual, never-ending glaciation, instead of to an alternation of cold and warm periods.

A reference to the existing condition of the southern hemisphere permits us, to some extent, to explain away this difficulty. The winter of the southern hemisphere is now about eight days longer than the summer, but the accumulation of snow has scarcely made any approach towards that of the glacial period. There is no reason to believe that it increases at all; but if it does, it is so slowly that a hundred years have not made it evident. We are therefore within our right in assuming that, under a condition of extreme eccentricity, the accumulation of snow would not approach the zone now called temperate until the excess of winter was considerably more than eight days, and would attain its maximum at the corresponding position of the solstice on the other side of aphelion. This snowy covering might thus well have disappeared before the position of midwinter in perihelion was reached, and the maximum effect of the sun would be some time after that position was passed. There is no doubt that in this there is a great difficulty; but as Mr. Croll has not referred to it, he is not responsible for the imperfect explanation which we have offered.

From his more especial point of view, Mr. Darwin has considered that the alternation of cold and warm periods, as described, will explain certain problems in the distribution of plants, which seem inexplicable on any theory of simultaneous glaciation at both poles. There are some species of plants common to the temperate zones of both hemispheres which are not found in the tropics, except on elevated mountains. How did they get there? How did they cross the equator? According to the theory we have been discussing, during a period of glaciation in one hemisphere, the line of greatest heat would reach far into the other, and the geographical equator might well be virtually included in the temperate zone. The plants of the colder hemisphere, flying from the increasing cold, or, rather, attracted by more favorable conditions nearer the equator, would gradually spread in that direction, and during the glacial period would flourish in the geographical tropics. As the thermal equator began again to approach the geographical, these would be driven into the higher lands, and would stay there till the hot zone had passed by into the opposite hemisphere: they would then descend, and, occupying the lowlands, would spread as far as possible towards the new ice-cap. Representatives of the species would thus be on both sides of the equator, and would necessarily retire to the temperate zones beyond the tropics, as the climate again changed. The probable solution of this botanical problem lends a strong support to the view which Mr. Croll has taken of the very different and alternating climate of the two hemispheres during the cold periods.

A peculiarly tempting feature of this theory is that it offers an explanation of the many puzzling changes of sea-level, traces of which are still manifest on our own and neighboring coasts. That many, and the most important, of these changes have been brought about by the action of internal forces, which we do not and probably never shall understand, is accepted by all geologists; but, in Mr. Croll's opinion, it is unnecessary to appeal to these forces as an explanation of all. He believes that many of them are due, not to a raising or lowering of the land, but to a lowering or raising of the sea; and that this raising or lowering is due to the attraction of the mass of ice accumulated near one or the other pole. His reasoning on this point is a necessary corollary of the theory on which he founds it, the alternation of the glacial period in the two hemispheres. Assuming this, he argues that an enormous mass of ice at or near one pole must alter, to some extent, the position of the earth's centre of gravity; that an excess of sea will therefore be drawn over towards the glaciated hemisphere, causing in it an apparent sinking of the land, whilst in the other hemisphere the land will appear to rise. He believes, then, that the "raised beaches," distinctly marked at many points of our coast, are the beaches so made at a higher level during the last period of glaciation; and that, further back, the junction of England with the continent was due to a withdrawal of the water from the North Sea, rather than to a real raising of the sea-bed.

That the accumulation of snow at one pole would tend to produce some such effect is mathematically certain; but the extent to which it would actually produce it is doubtful, and would depend entirely on the extent of the displacement of the centre of gravity, and, therefore, on the thickness of the ice-cap over the glaciated

pole. Mr. Croll believes this to have been, in some instances, very great: he believes that, even now, it is very great at the south pole; but the measure of this belief is founded on assumptions that will scarcely be generally accepted. He assumes, for instance, that the south polar region is occupied by a continent, which reaches in every direction to an average distance of twenty degrees from the pole, or rather more; and that this continent is covered with an ice-cap of a thickness sufficient to permit it to discharge icebergs by the natural motion of the ice. Now, he argues from experiment that ice will not move over a slope of less than one degree, and that this slope, carried from the coast-line to the centre of the hypothetical continent, gives a thickness of twenty-four miles.

That icebergs of enormous size are discharged from the south polar region is well known. Mr. Croll has given the estimated dimensions of many that have been seen, from which it appears that a thickness of more than a mile is not uncommon; but the evidence of a continent three thousand miles across, or of an ice-cap twenty-four miles thick, is scarcely satisfactory. Mr. Croll is indeed willing to accept one-fourth of this thickness; but clearly, if the bases of his argument are sound, twenty-four miles, and not six, are necessary to meet the requirements of the known fact that huge icebergs are discharged. If he accepts a possible thickness of six miles, it is that he admits that ice may move on a much less slope than has been experimentally proved, and the very groundwork of his argument crumbles away; for there is as much reason to suppose that ice may move on a slope of one-hundredth part, as on one of one-fourth part of a degree, and, for aught we know to the contrary, it may be merely a question of time.

We thus find ourselves without any trustworthy data on which to base any calculations regarding the displacement of the earth's centre of gravity during the periods of maximum glaciation; and though we would freely admit the possibility of a displacement that would lay bare the North Sea, and carry our coast westward to the one-hundred fathom line, or that would, on the contrary, lay under water a great part of the lowlands of England, Scotland, and the adjacent countries, we are unable to admit it as a certainty, and are the more compelled to doubt, as a familiar proverb warns us ever to mistrust what seems probable. We think it is extremely likely; we know that it is extremely tempting; but it is not proved.

Another feature of Mr. Croll's theory, which is still more tempting, and which seems based on more certain evidence, is the possibility, the long-wished-for possibility, which it promises of a really scientific estimate of geological time; for all attempts that have been made on purely geological bases have proved, on investigation, unsound and altogether unsatisfactory. Of these attempts, the most common has been by reference to the thickness of different strata, and an estimate of the time requisite for their deposition. But the calculations so made have been wild in the extreme, the general tendency of uniformitarians having been to run away into appalling statements of hundreds and thousands of millions of years. Mr. Croll considers that this propensity to exaggerate is due partly to the inability of the human mind to form any real conception of the meaning of very high numbers. A unit, followed by six, or twelve, or eighteen ciphers, is an arithmetical expression, and nothing more.

This incapability, however, whilst it has perhaps permitted the acceptance of the exaggerated estimates, is not responsible for their being. This has followed from the method which has been adopted of referring different formations to a mean rate of deposit, instead of to an exceptional one; of virtually supposing, in fact, that earthy matter washed into the sea is uniformly spread out over the whole bed of the ocean. This, of course, is not the case: probably no one for a moment would think of asserting it, though many calculations have been made after tacitly assuming it. Deposits washed into the sea cannot, as a rule, reach beyond a distance of a hundred miles, and spread over even that very partially. The Mississippi, for instance, brings down from the sea each year upwards of seven thousand millions of cubic feet of solid matter; but as this is almost all laid down in the northern part of the Gulf of Mexico, clearly in a future age the thickness of this stratum can form no measure of time if compared with the formation of river deposits under very different conditions.

Similarly, although from the quantity of solid matter carried down each year by the principal rivers of the globe, we can calculate the mean rate of denudation now going on in their respective basins, it is utterly impossible to say what is the rate of denudation in any specified district. Professor Geikie (Archibald) has com-

puted that the sediment brought down by the Mississippi in six thousand years, the Ganges in 2,358, or the Po in 729 years, is equivalent to a mean denudation, throughout their respective basins, of one foot; but no geologist would maintain that the demonstrated removal of one foot, at any given spot, necessarily corresponded to the computed number of years, or, in fact, bore any relation to it Attempts to fix the chronology of the past by any such calculations have always appeared to us utterly futile, a waste of much labor and ingenuity.

Mr. Croll, for the first time in geological science, has proposed to calculate the past epochs on an astronomical basis. From a formula given by Leverrier, he has computed the eccentricity of the earth's orbit at intervals of fifty thousand years, or, in special cases, at intervals of ten thousand years, for a period extending, in all, over four millions of years. This calculation is liable to the objection that the formula is proposed by Leverrier only with reference to a comparatively short period — a hundred thousand years — backwards or forwards, and its application to a period so extended as three million years is quite uncertain. It is beyond the power, even of astronomers, to say positively what was the condition of the solar system three million years ago, or what it will be one million years hence. Mr. Croll's calculation is, therefore, based on the doubtful hypothesis that the solar system through all ages has been and will be subject to the same forces and disturbances as at present; and on this hypothesis he arrives at the conclusion that periods of extreme eccentricity have happened one, two, and three hundred thousand years ago; again between seven and nine hundred thousand years ago; and at other epochs still more remote, the greatest within the limits of his calculations occurring two and a half million years ago.

Comparing these figures with the geological record, he concludes that the last glacial period, whose signs are those which most clearly remain, coincided with and extended over the two latest of these epochs, being at its astronomical maximum two, and again one, hundred thousand years ago, and continuing as distinctly a cold period to between seventy and eighty thousand years ago. Within this limit the computation may be accepted as fairly trustworthy. The more remote determinations, reaching back to a million or three million years ago, astronomical epochs which Mr. Croll wishes to identify with the periods of the middle and early divisions of the Tertiary age (Miocene and Eocene), must be considered as much more doubtful; but, failing any more exact knowledge, they may be accepted as vaguely measuring the lapse of time since the beginning of the present forms of life.

Sir William Thomson's calculations, that the age of the world cannot exceed one hundred millions of years, have at least a mathematical and physical basis. Professor Ramsay, perhaps the first of living geologists, has expressed his opinion that, as compared with the vast extent of geological time, the oldest formations are things of yesterday. The collocation of these two decided opinions of men, of all others the most competent to form opinions, serves at least to bridle the imagination, which has been apt to run riot in a labyrinth of unmeaning numerical expressions.

The reference of the last glacial period to an astronomical epoch eighty thousand years ago, gives a plausible estimate of the antiquity of man in this part of the world. From a long examination of the older stone deposits, Mr. Geikie has shown that palæolithic man was in this country contemporaneous with the last tropical mammalia, and that beyond a doubt these were antecedent to the last glacial period. All the geological evidence is to the effect that since then our climate has been continually improving: there has been no intervening warm period. It has long been admitted that between palæolitic and neolithic man there was a distinct gap: the one did not merge by gradual improvement into the other. Mr. Geikie would conclude that the cause of this gap was the burying the greater part of Scotland and England under ice, and the small remainder under water. He considers, then, that the remains of the tropical mammals and of palæolithic man are to be referred to the last warm period, that is to say, about ninety or a hundred thousand years ago. These, as far as England was concerned, were exterminated or driven out by the increasing cold; the man maintaining his ground long enough to mingle his bones with those of the arctic animals which took possession of the country. After the lapse of many ages, when the ice-cap had partially disappeared, other men took his place — men of different form, habits, manners — neolithic men. These were contemporary with many of the arctic mammals not yet withdrawn to the north; amongst others,

the musk-ox and reindeer. It is of course impossible to fix the date of this new intrusion: the amelioration of our climate was very gradual, and both musk-ox and reindeer continued for a long time to roam as far south as the Pyrenees. Neolithic man certainly lived with them and on them, and nothing in the evidence would point to a later date for the post-glacial colonization of this country than about sixty thousand years ago.

Mr. Croll's theory is so pretty, and the results are so fascinating, that it is difficult to avoid being carried away by a feeling of æsthetic admiration unsuited to scientific inquiry. It costs us an effort, as we conclude, to call to mind any of the objections against it. Of these, we think the one which we have mentioned as raised by Sir Charles Lyell has very great weight; but of even greater weight do we consider the objection that the ocean currents — having the enormous climatic influence which Mr. Croll has proved them to have — may increase, but may, on the other hand, act contrary to the effect of the orbit's eccentricity. Mr. Croll believes that they must necessarily increase it; he believes that the greater part of the inter-tropical drift must necessarily pass into the warm hemisphere. So far as depends on the position of the thermal equator, we fully agree with him, but we cannot, with him, ignore the effect of the trend of the coast-line, which must act independently of cosmical conditions; and whatever effect we may allow to changes in the eccentricity of our earth's orbit, we believe that the relative severity or mildness of the cold and warm periods must have been measured out by the coast-line of Central or South America, of New Guinea, and the adjacent islands, and have been determined by the volume and temperature of the Japan Current and of the Gulf Stream.

From Good Words.

WHAT SHE CAME THROUGH.

BY SARAH TYTLER,

AUTHOR OF "LADY BELL," ETC.

CHAPTER XLVI.

THE SUGGESTION OF AN OLIVE BRANCH.

JANE was full of breathless expectation when she arrived at the close, and in passing glanced across to Willow House, where she had occasionally lived with her mother and brother when she and Archie were young.

So far as the tall old red house was concerned, it gave no sign. No face or figure appeared at window or gate, to electrify Jane into making the silent emphatic note, "That is she — the humble woman who bewitched Archie, but having won him could not keep him."

Even after Jane had reached her destination, and was in the middle of a group consisting of merry, chattering girls, gracious mother, father given to old-fashioned, courtly compliments, and freer, blunter brothers home from barracks and college for the festival, she made no way in the attainment of her object. She became all at once painfully aware that she dare not approach by a single leading question her real reason for coming to Stone Cross; and she despaired of getting her ignorance enlightened and her curiosity gratified by a single incidental allusion to Willow House and Mrs. Archie Douglas. Not only were the speakers bound to avoid these interesting topics, as too awkward and distressing for Jane Douglas to be referred to even in the most masked and distant manner in her presence; in addition, the festival was engrossing the natives of Stone Cross as her birthday was engrossing Lady Lewis.

Helen Tuffnell was to sing in the choir, and so there was no end to the discussion of the choir's dress — in the case of its female members — to its obligations, and its expected triumph. Ralph Tuffnell had seen the professionals arriving, and was able to tell, if he chose — that is, if sufficient force were put upon him — who had kept faith, what the stars least known to Stone Cross were like, and which of them were gone to be the guests of the musical archdeacon and his sister.

There had been a dreadful whisper that the bishop looked coldly on the whole affair, and set his face against some of the pieces to be given at the second concert; but Mr. Tuffnell had been at a meeting of the chapter that morning, and was happy to have it in his power — from the private conversation which had preceded the business — to contradict authoritatively the unworthy stigma on their excellent bishop's liberality.

Mrs. Tuffnell wished to hear if anything more had been learned — if Jane Douglas had noticed anything said at the Hynds, where she had lunched with the Russels — of the story that "Mrs. Dean" was to have all the great singers, irrespective of social disadvantages, at her party; and

that one of them had agreed to sing her special ballad, "The Lady of the Lea," for the delectation of Mrs. Dean's guests, and the glorification of her party.

Jane Douglas was musical in her tastes. Not having come out, even the mild clerical gaiety of Stone Cross festival ought to have been to her, as one of the poor dear Russels had said, for her own ends, a "charming variety." But Jane's young head was full of her own personal speculations and private cares for poor Archie and his poor wife. Mrs. Archie must be terribly out of place, and constantly exposing her deficiences in the Stone Cross circle. Still Jane would be tender of her for Archie's sake, even though he was puzzling and confounding his sister far more than he was perplexing his mother. Was he not acting as if he were heartlessly abandoning the woman whom he had chosen to withdraw from her natural sphere, in exposing her unsupported to all the difficulties of a strange region?

Jane had a somewhat formidable apprehension of what Mrs. Archie must be like, not altogether removed from that which Mr. Woodcock had entertained before his visit to the Yorkshire Grey.

Mrs. Archie ought to be a brilliantly painted piece of clay — rich red and white, perhaps already getting too deeply colored. She should have chubby lips like those of a child, apt to fall open into a gape. She should have round cheeks, round eyes, a little round forehead, and fat dimpled hands. Her feet, like her hands, must be unpresentable and hard to dispose of, as things not wanted, and therefore always in the way.

She would be prone to render herself conspicuous by indulging in the gayest of clothes, worn in the height of the fashion. She would stalk, or trot, or gallop, instead of walking. She would either mumble or shout, when she ought to speak. She would abuse her h's at the beginning, and her g's at the end of her words. She would run wild in her grammar, and betray ignorance, all the more dense and appalling that it was entirely unsuspected by herself, whenever she had the opportunity.

Jane took all these particulars as a matter of course, was girlishly dismayed and repelled, and yet was sufficiently true and good herself to draw a long breath when all were summed up, and tell herself that if that were all, redress — compensation in the end — might still be possible.

But listen and look, as Jane strove when she accompanied Helen Tuffnell to a private rehearsal on the part of the choir, she could not catch a glimpse of her sister-in-law. She had no better success on the first day of the festival, neither at the morning concert, nor at the great evening performance of the oratorio — when the hall was crowded to excess; and among the old familiar faces of the Stone Cross society Jane hunted up every new and strange face, and sought in vain to identify it with her preconceived idea of Archie's wife.

Archie's wife was not that little woman in sky-blue, with the amber-colored opera-cloak, beside the Joneses? No; Jane had an impression that she had heard her unknown sister-in-law was tall, and unquestionably she was handsome; while this woman, making every allowance for different standards, was neither the one nor the other.

She was not the lady to whom the archdeacon was talking with marked deference? She was both tall and fine-looking, but she was thirty years of age at the lowest computation. Besides, it was well known that the archdeacon was musically mad, and chose his favored associates solely with reference to their knowledge and skill as executants, or to their natural qualifications as sopranos or contraltos, tenors or basses. Now, it was hardly to be supposed that Mrs. Archie could have come out of her cottage an English Jenny Lind, minus the requisite training.

In the first place Jane was proceeding on an incorrect deduction. She had never doubted that Archie's wife, who lived at Willow House, would be received on one footing or another in Stone Cross society.

Jane had imbibed from her mother an extravagant notion of Archie's importance as the squire of Shardleigh. She had taken for granted that the reflection of a certain amount of his dignity must fall on the woman to whom he had stooped to give his name.

Jane was saved from putting a plain question to Mrs. Tuffnell, on which she was reluctantly meditating, by the appearance of Rica Wyndham. After the first part of the oratorio had been gone through and received with the cordiality of provincial audiences, Rica, who was only an honorary member of the choir, so to speak, judged in her own interest that it could dispense with her farther services. She had herself led into the body of the hall, and seated among the company, in order to make game of the rest of the performers and their performance, with a distinct

relish of the circumstance that the sacred character of the music lent an air of profanity to her jests.

"I imagine everybody in Stone Cross is here," said Jane Douglas, next whom Rica had elected to sit. Jane craned her neck, nevertheless, as if she were in search of somebody.

"Oh yes! the world and his wife and their whole turn-out," answered Rica indifferently. "I wish you to pay particular attention to this trill on 'My sins are more in number than the hairs of my head.' I think it will give you the idea of recalling what Tom calls 'going to the bad' in the most daintily instructive manner. It is given to a little man — a native, Horace Wyville — who is quite bald, and whose voice always shakes with fear of the conductor, as if he were penetrated with the terror of retribution for his misdeeds."

The next moment Rica was criticising the style in which a lady's hair was dressed, and remarking that she would be a passable beauty if she did not simper like a ninny. "Her face reminds me of your sister-in-law, Mrs. Archie Douglas, but Mrs. Douglas has the advantage," added Rica composedly, intending to make an impression, and succeeding, though the impression was not of the nature that she anticipated.

"Is Mrs. Archie Douglas here?" asked Jane, after a moment's pause, with commendable self-restraint, but with a very perceptible increase of color in her fair complexion, while her flaxen hair, worn loose on her shoulders, was astir with expectation.

"Of course not, my dear Jane, what are you thinking of?" replied Rica with the usual background of rippling laughter to her marked emphasis.

"Why not?" inquired Jane, opening her grey-blue eyes, and losing a little of her assumed calmness. "Is she not fond of music?"

"I cannot tell: I dare say she adores it, as we all do in this age of operas and oratorios. But, my dear child, you should know best why nobody knows her, and she goes nowhere."

"I do not know," said Jane quickly, "that is, of course, you are aware, Rica, that I do not know her." And then Jane was in a fever to exculpate whoever could be exculpated. "Come with me, Rica," she entreated in a whisper. "I do not so adore music, and neither I think do you, as to mind missing the next long duet; there is a side room to escape in from the heat, Helen Tuffnell took me to it last night; let us go there and have our talk out."

Rica went and listened at her ease to what Jane labored to explain.

"Archie married without telling us, and without consulting mamma; because, I suppose, he did not wish to meet with the opposition which he was sure to provoke, since the wife he chose was not in his own rank," said Jane, with all her heart in her voice. "Mamma had cause to be offended, but after all there was no great wrong done, though there might be much imprudence on Archie's part, and we — mamma could forgive anything save great wrong to Archie."

"You are all very good, but I do not see why you should be ready to give me a wigging," protested Rica, with her unblushing slang.

"We can understand," hurried on Jane to her unsympathetic listener, "that it must have been a little hard for the two to get on together — after Archie had ceased to live as she lived when he was seeking to find for himself what a working-man's experience was like, for the sake of working-men. Therefore she has come here for the present; and he has gone away cruising about Spitzbergen and Archangel. That is all," Jane ended her shaky version with a deep sigh.

"That is a good deal, except to an innocent like you," said Rica, with her derisive scepticism. "Excuse me. Jane, but never say to any one else that Archie was seeking the public good when he was courting his peasant wife, else they will think you positively too good to live. They will look for your embryo wings, and declare that Archie did not need to sail to the north seas to visit any Archangel, when he had such a promising minor angel, like a minor canon, at home. The pun is execrable, but the blame is yours who tempted me to it. It was madly romantic in Archie to marry such a girl, without his giving out that he was in quest of a Holy Grail, or of the public good. I should rout all such nonsense out of his head in a month's time. I was near doing it when madam the low-born wife turned up."

"Don't Rica," cried Jane, indignantly; but she was not disposed to quarrel with Rica, just at this moment, when she might cast light on the mystery of Mrs. Archie Douglas's exclusion from the festival. "I don't know what you believe."

"No more do I; but certainly I do not believe that Archie wanted anything else save his own way — to run wild, and do what nobody else did. At the same time

I don't mean to say that Mrs. Archibald Douglas could help that; or that she did anything save what was natural under the circumstances. My dear Jane, you do not give me half my due for good-nature. I am young Mrs. Douglas's established champion here. I am the only person in these polite circles who has gone a step out of her way to take the lady up. I am quite fond of her. Mamma would tell you that she is a mania of mine."

"Yet you spoke as if she could not be here," remonstrated Jane in her bewilderment.

"Well, I don't do my manias in public. At least, I don't mind who are spectators; but one wants a little freedom for psychological studies. As to Mrs. Douglas's not being here, or at our bazaar, or even at our flower-show, I should say that she would have even less sense than she gets credit for, if she were to go where money might admit her, but where she would know nobody, and nobody would know her; and where at the same time she would be an object of general remark, with her whole story and her antecedents raked up, if not flung in her face. You forget, Jane," finished Rica, with her admirable candor, "that Mrs. Archibald Douglas is a humbly-born young woman, from whom her husband has already separated, while he barely acknowledges her, and his family do not even go so far. You should be the last to speak; you ought to think twice before you reproach the good people of Stone Cross with not knowing your sister-in-law."

"I had no idea—" began Jane in dismay, and stopped short. She had not, in fact, had a suspicion of the wrong which Archie and his friends might have been doing to his forlorn wife, and of the neglect, even the injury, to which they might have condemned her.

"And if she is odd, as people say, though I confess I do not see it, then it might not be safe for her to be exposed to such an exciting scene as this," said the Job's comforter, Rica, with a sneer at the festival in passing, and into the bargain.

"Odd! what do you mean?" demanded Jane sharply, in the sickness of remorse and apprehension that was stealing over her.

"Why, isn't she a little touched in the head by her exaltation, or her desertion, I am sure I cannot tell which? The report came with her that she was one-third crazy, and that Perry and her husband were to be the keepers. Allow me to add that the county society of England, as represented at Stone Cross, did not feel flattered by having its chances of visitable neighbors abridged, with Willow House transformed into a private asylum."

"It is not true," cried Jane, in the greatest distress. "I never heard of such a thing. I should have been sure to hear of it. As if it were not bad enough without that! It is cruel and wicked to invent such stories."

"I believe they could be traced to Perry herself," said Rica quietly. "Pray do not give me the credit of the invention. My conscience is clear. I have always insisted that the young woman was only uncommonly clever; though I admit when I first spoke to her I took care there should be a man with a pitchfork in the next field."

"I shall go and speak to Perry about it," said Jane with tremulous imperativeness.

"The very thing to confirm the rumor, if you do not speak to Mrs. Archie Douglas also," pointed out the astute Rica; "and don't you think that it would be more to the purpose, any way, if you spoke to Mrs. Archie Douglas?"

"If it would do any good," said Jane, half-eagerly, half-hesitatingly. "Mamma will be dreadfully sorry when she hears what has been said and done. There is nothing wrong with my brother's wife, except that she was born and brought up in a different station from his—and I suppose that has caused disagreement between them. Archie would have let his wife have Shardleigh, where mamma has always been mistress—Mr. Woodcock said so. If there would be any use in my calling on her—" repeated Jane, in desperate doubt.

"There would be the greatest use," declared Rica, always ready for an adventure, above all if it led a companion into mischief. "It would be lending her your support, and it would at once silence the absurd report that she is maddish. I shall go with you, if you like, and introduce you; for I am proud to say that I am on speaking terms with Mrs. Archie Douglas, since it has been my plan to take the bull by the horns, and to decline to be frightened by a bogey. I should not wonder if, after they hear that we two have broken the ice, mamma, and Mrs. Dean, with the whole clan at her back, follow our example, and take Mrs. Archie into their arms."

Jane made up her mind to the deed. In the light in which Mrs. Archie Douglas was regarded at Stone Cross, it was Jane's duty, and duty was a more powerful motive with Jane Douglas than with most

girls. It was for Archie's honor too, and surely according to his secret inclinations; for he must retain some kindly feeling towards the woman whom he had loved so well as to seek to raise her to an equality with himself.

Jane did not wish to compromise the Tuffnells by communicating to them her enterprise, and asking them to join her in it. Though her good sense led her to see the reasonableness of Rica Wyndham's vindication of the town, Jane's pride and her tenderness alike remained hurt by the complete neglect which had befallen Archie's poor wife at the hands of Stone Cross.

Again, Jane accepted Rica Wyndham's companionship, because she did not believe that it would be possible to compromise Rica; and because though Jane had a spirit of her own, no girl of eighteen's spirit could help quailing a little before the difficult mission which she had undertaken.

Jane and Rica agreed not to patronize the next morning's concert, but to go together and call at Willow House. Jane fired up for her sister-in-law, and yearned over her whenever she thought of the whole town — herself included — holding carnival, and of Archie's wife being forced to remain aloof. She began to think that they — even her mother and Archie — had been very wrong to act so as to bring about such isolation, and such cruel, false surmises. She began to ask herself what her father — for whose memory she had the most loyal, loving respect — would have thought of the manner in which his daughter-in-law had been treated, — she began to suspect that Mrs. Archie Douglas would have fared differently if the old squire and manufacturer had still lived. He too had risen from the ranks, but in place of being subjected to an ordeal from the torture of which even his man's strength might not have shielded him, he had been chosen by her mother with womanly pride in his being the founder of his family, and the maker of his fortune.

CHAPTER XLVII.

THE OLIVE-BRANCH BEARS PRICKLES.

MR. PERRY broke the news to Pleasance that Jane Douglas was in the close.

It was a lovely June morning, and Pleasance had gone into the garden to console herself with the roses and the bees. She needed consolation specially, at this time, for indeed she had some of the feelings which Jane Douglas attributed to her, and which Jane suffered by proxy on Pleasance's account.

The town was keeping its festival for the first time since Pleasance had come to Stone Cross. It could hardly be said to extend freely to all classes; yet it was more or less felt and hailed by all, in the general influx of strangers and in the holiday preparations. The railway was continually disgorging fresh arrivals, who were conducted by triumphant friends to canons' and dignitaries' houses. There was a flutter among the native performers of practising, rehearsing, and hurrying to and fro, with sheets of music, to the hall. The shops were full of programmes and announcements. The lodging-house keepers were reaping a golden harvest. The very washerwomen were in extreme request for the muslins which were to do duty at the morning performances. Mr. Perry had an annual offering of evergreens and flowers towards the decoration of the hall, and of fruit towards the archdeacon's supper to the choir, for which the gardener was in solemn preparation. Even Mrs. Perry had been in the habit of unbending, so far as to go to look at the supper, and at the archdeacon's company.

Only Pleasance, the most friendly soul in the universe, whom no sorrow of itself could make unsympathetic, was sentenced, for no fault of her own, to stand apart.

It was irksome to be compelled to fill a position which was at the same time not natural and was of no earthly avail — and that in a town where she and her story were so well known, that she could not do anything without being called upon to consult public opinion in reference to her husband.

Pleasance chafed more than she had ever yet done at the restrictions which she felt were laid upon her, and said that she would not wait, wasting her best days till she grew middle-aged at Stone Cross. She had been accustomed to think that she could take care of herself; she would no longer consent to resign her prized independence because she had ceased to be that happy creature, a working-woman, and had become that miserable being, an idle lady. She would write and ask Mr. Woodcock — he had shown her kindness — whether she might not go abroad and live in some quiet, homely, foreign place, where nobody had ever heard of her or of the Douglases of Shardleigh. If Mr. Woodcock retained his scruples, then she would take leave to dissolve the compact, so intolerable where she was concerned.

Pleasance was in this frame of mind

when she went down among the roses and the bees, and was met by Mr. Perry. He had been up to the house in search of his wife, and had missed her; and he was compelled to return to his office of arranging fresh pots of flowers, in time for their transport to the hall, without being able to effect the communication with which he was primed.

Pleasance saw that her retainer — with regard to whom she could not help thinking again this morning, that he was half a gaoler — overflowed with some piece of information which, in the absence of his better half, he would not be able to keep to himself. But she did not expect anything of more moment than a mingled glorification and lamentation over the excellence of the Willow House fuchsias and geraniums, and the damage they would sustain by their service in the hall; and over the size and flavor of the Mayduke and Elton cherries, and the Hautbois strawberries, and the grudge with which their grower saw them destined to be "devoured by them choristers."

But Mr. Perry had other intelligence to communicate, after he had touched his hat punctiliously to Pleasance, and told her formally that it was a fine morning.

"I have been down in the town with a load, Mrs. Douglas. I know it don't become a 'ead gardener to carry such, but I can't trust my flowers to a rogue of a boy, and I had your leave. Who should I see coming out of the close but Miss Douglas from Shardleigh. She did not catch sight of me to speak to me, as I make bold to say she would have done; so I made inquiries and 'eard that she was 'ere by herself without either Mrs. Douglas or the squire. She is come for this 'ere festival, and is stopping with Mr. Tuffnell's family in the close."

Pleasance observed — very little to the point — that she understood many visitors from different parts of the country had arrived to attend the festival, and retreated into the house, to digest the unpalatable tidings. But she had received a shock, for with the mention of the sister the brother's image had risen up before her, though the illusion had been dispelled before Mr. Perry had done speaking.

Pleasance decreed that this was the last straw which must break the camel's back. While she said so and sat in her room thinking of it, Mrs. Perry knocked at the door and announced with an inscrutable face that Miss Douglas and Miss Wyndham were in the drawing-room.

Pleasance hesitated for one moment. Should she refuse to receive them? But that would look like cowardice and as if she were ashamed of herself, while it was they who ought to be ashamed. It would also be a breach of that hospitality which is nowhere more respected than in the class of which Pleasance had so long been a member. During all those years at the manor-house she had not once heard "not at home" given in answer to the most troublesome and unauthorized intrusion.

In the mean time Jane and Rica — the former with a palpitating heart — sat in the drab drawing-room. Jane was quite familiar with the room, and it did not repel her by its coldness and bareness. She had pleasant early associations connected with it; and, in the light of later years, its space and comparative emptiness reminded her almost pathetically of the last Italian palazzo in which her mother, Archie, and she, dwelling together as a united family, had found a temporary home.

But as she recovered coolness, and looked round her, it struck her that the room had suffered change and deterioration.

On the closed and superannuated grand piano stood Pleasance's array of birds' cages — not fancy pagodas of brass wire, but clumsy square boxes of unpainted wood and iron wire; for Pleasance held that the brass dazzled the birds when the sun shone on it, that they pecked the paint till they were cruelly poisoned, while round cages turned their poor little heads. Plain as the cages were, they were not plainer than their inmates, for the most part half-fledged and with yellow, gaping mouths, in rough imitations of nests constructed of straw and wool.

A pile of books lay on one little table, but they were conspicuously of the unornamental order of school-books, in grey paper or severely sober cloth covers. Some of them were old and worn. In particular there was a disreputable dictionary with the boards stitched and restitched, and in spite of that primitive repair, having one-third of its leaves in a loose and tattered condition. (Pleasance could have told that its price was above rubies, since over the time-honored name of Surenne was written in a cramped schoolgirl hand, "Anne Hatton.")

Pleasance had, the very day before, stumbled at last on the case of a poor widow with a family calling for immediate relief. As a result, there were heaped upon another table the rudiments of such coats and garments as Dorcas might have made, and which Dorcas's followers in

every rank still aspire to make, even with dainty fingers; but which, as a rule, are not found on drawing-room tables, unless on the occasion of a missionary or sewing meeting. Beside the calicot lay a thimble, which from its surroundings was not likely to be of gold, and was indeed of brass. (It was also invaluable to Pleasance. It had belonged to Lizzie Blennerhasset; and Pleasance clung with passionate fidelity to the smallest link of the past — having nothing else to cling to.) There was a great nosegay on the chimneypiece, but it was not from the Willow House gardens. Pleasance had got it in the market that morning, and had chosen it expressly for its long gold and silver rods, rampant blue lupins, straggling purple honesty, bunchy sweet-williams, honeysuckle, tansy, bachelors' buttons, and London pride. She had not found time to soften the details in arranging them. She had simply stuck the flowers in a jar on the chimneypiece, where they presented a by no means brilliant mass, towering and yet solid, of subdued color and sombre green. They gave the jar the air of a cottage jug, which would have been such a nosegay's fit receptacle.

Jane Douglas would not have been offended by such particulars in their proper place; but she had the desire for fitness and the uneasy sense of incongruity which belongs alike to very matter-of-fact people and to people of the keenest susceptibilities. Jane was matter-of-fact, and she had, in addition, a share of her mother's susceptibilities. Mrs. Douglas was an original woman; but she hated originality's caricature — eccentricity, and she had deepened the girl's natural revulsion from singularity. And though Jane had lived much abroad, she had remained, like many English residents in foreign cities, insular in her prepossessions and prejudices.

While Jane looked round her discontentedly, Rica Wyndham took everything in at a glance, shrugging her shoulders and exclaiming in a stage aside, "I beg your pardon, Jane, dear, but was your brother's wife a seamstress originally? And is she still following her calling, on the sly, like the princess in the 'Arabian Nights,' who was impelled to do her old cooking in the cream-tart-with-the-pepper business? Or is Mrs. Douglas teaching the young idea how to shoot in her own person, having recourse to copy-books and primers in order to put Archie and the whole of us to shame, by coming out at last as a full-blown female Porson? I heard something of that old fat Madame Berbier being in attendance. I was astonished, because Berbier does not teach music, and to strum a tune on the piano is generally the beginning and end of a girl of the lower class's ambition to be educated like a lady. Shades of the Willow House gardeners! where did she get that flower? Not in the gardens here, surely, else Perry male is a degenerate son of Adam. I have not seen such a flower since we lived for six months in the depths of Cornwall, and an ancient gardeners' procession, of which Father Adam must have been the founder, walked through the little town near which we hung out. I am afraid, Jane, there is mint in it, and as there is no lamb to bear it company, do you think we might take the liberty of throwing it out of the window?"

Before Jane could object to the suggestion the handle of the door turned, and Pleasance entered and faced her visitors. She wore a delicately fresh blue-and-white gown, such as would have matched Jane Douglas's brown holland, when she was at home, of a morning. Pleasance's little cap, which she still wore, was not out of keeping with such a gown, and was, as it happened, somewhat in the fashion of the day, while it lent a matronly dignity and character to her simply-dressed dark hair. Her costume was perfect of its kind, as Jane acknowledged in amazement at the first hasty glance. Her next admission was that Archie had found — not a pretty gawky or a strapping Amazon — but, as Pleasance looked at this moment, one of the most beautiful, distinguished-looking women whom Jane had ever seen. With the last conviction there darted upon Jane the dismayed perception that she had taken an utterly false and indefensible step.

Rica Wyndham, nothing daunted, was saying, in her contralto voice, rich with laughter, "Mrs. Douglas, I have the pleasure of bringing Miss Douglas to see you. You must make much of us, for we have stolen a march upon our friends, and forsworn this morning's concert on your account."

"I regret you should have made such a sacrifice," said Pleasance, striving to be courteous in words, though inevitably freezing in tones. "I am afraid that I cannot repay you."

But as she spoke she not only motioned her intruding visitors to be seated, she selected for their accommodation the sofa and the *chaise longue*, which were the most comfortable and pleasantest seats in the room. Before she sat down herself, she pulled the cords of the Venetian blind

so as to prevent the sun's rays from shining in Jane Douglas's eyes, and closed the side door, so that there might be no draught of air between it and the open window behind Rica Wyndham.

Rica, who was never at a loss for words, plunged into an animated description of the progress of the festival; while the two who had a near interest in each other sat and supported their share in the conversation by monosyllables, as they revolved a maze of troubled thoughts.

Was this "divinely fair" woman, who must have driven Archie desperate by her coldness, indeed the silly, quaking, rude, possibly gross-natured, country girl, with regard to whom Jane Douglas, in her nonage and inexperience, had boldly proposed to herself the difficult and invidious task of catching her and taming her, and that within the few days of Jane's stay at Stone Cross?

This young girl could not be Joel Wray's sister Janey. Her most striking attribute was the perfect good breeding which rendered her quietly self-sustained and unconsciously refined, so that Pleasance forgot to notice Jane's flaxen hair, so far removed from her brother's dark curls, or her blonde in contrast to his brunette complexion; and only remarked, instead, that Rica Wyndham—piquant, coquettish, aristocratic, in her most startling escapades—did not bear the comparison well, or look elegant beside her friend. This could not be the good little thing whom Pleasance had seen in imagination, a simple, homely girl, a mechanic's daughter and sister, rendered more sedate because she had to work with, and for, her widowed mother. That had been a girl Pleasance had made up her mind to be fond of; while she should be to her, when they did meet, in the few opportunities that working-people could command, the kind elder sister that her lost Anne had been to Pleasance.

So the sisters met, without sisterly recognition, far less sisterly embrace. When Jane, with a deep sense of the horrible blunder she had committed, tried to say something to Pleasance, and asked her, "I hope you like Stone Cross, and find this house comfortable?" she could not address her by name, she could not call her Mrs. Douglas, she could not say her Christian name, if Jane had ever heard it; she had to speak to her impersonally. It was a small matter, but it afforded a subtile indication of the terms on which the two stood.

"I have no fault to find," answered Pleasance, driven to a negative form of speech; but she had no wish to be ungracious on this point, and she added immediately, "Stone Cross is an interesting town."

"Oh, you happy woman!" exclaimed Rica, in reference to the first part of Pleasance's reply. "I have faults to find with everything under the sun; indeed, I do not believe that I should care for anything much, if I could not exercise my Englishwoman's privilege of grumbling, for we don't resign the privilege to the men, do we?"

"I hope Perry suits you," said Jane again wistfully. "She was a favorite servant of mamma's. We always found that we could depend upon her."

"Mr. and Mrs. Perry are very good servants," said Pleasance readily enough; but the next moment she qualified her testimony with a haughty exception—not in reference to the Perrys' fallibility, but to her own inexperience—"at least, so far as I can tell; I have very little knowledge of servants."

Jane was silenced. She thought it was odd and objectionable in Mrs. Archie Douglas thus to remind them of her disqualifications.

"But why have you not countenanced the festival?" Rica was asking audaciously, in comfortable disregard of her own statement to Jane that Mrs. Archie Douglas, in her circumstances, did well to refrain from going where only money would admit her, and where, in social phrase, nobody would know her. "I assure you that you are losing a treat, not only in the performance of the great guns, but in our native tenor's swaggers, and our Stone Cross prima-donna's sulks. He is Bell, the linendraper's assistant; and she is a *bonne* of the Ridley's, whom the archdeacon dug out, and who has to be constantly called to order for her *bêtises*. She makes such astonishing faces, that I always remember and fear the punishment with which we were threatened as children, of the wind's changing and arresting our *moués*. In that case, '*l'homme qui rit*' would be nothing to '*la femme qui boude.*'"

"The man would certainly have the best of it, if it were not for the grim satire of the conception," observed Pleasance, as unconscious of producing an effect, as when she had recognised the representation of "Dora" in the manor harvest field. Then she answered the more direct question: "I do not go into company; I have not been used to it. I am not so fond of music—I am afraid that you will

think it very shocking in this musical age," she broke off with a little smile — "that the festival should tempt me to break a rule. Neither do I know that I should be diverted, as you say, by the struggles of the Stone Cross musicians. I think I should rather have a fellow-feeling with them."

Again Jane Douglas had the impression that Pleasance was assuming a defiant attitude, and that she was discomfiting to deal with, since she showed a want of tact, even of proper feeling, in thus exposing rather than veiling her deficiencies. Jane ceased to congratulate and remonstrate, in the same breath, with Archie, in her own mind, and began once more to condole with and be sorry for him.

It was true that Pleasance was inclined to unfurl and brandish her colors, in the differences that existed between the speakers, in this interview; but then Pleasance was at bay.

"Do come and try," Rica urged. "If the tickets are all sold, I shall make somebody give up his, or forge one for you. We will keep a seat for you in the front row."

"We shall wait for you in the cloak-room, if you wish it," Jane made an amendment on the proposal. She stood loyally by what had been her own idea, though she felt that its fulfilment, if it would be in one sense less trying than she had supposed, would in another be very disagreeable, when Archie's wife, beautiful and intelligent in spite of her provincialism, was also wrong-headed and self-willed."

"Thank you, I do not wish it," said Pleasance plainly.

"Not to see all the notabilities! not to get an introduction to Stone Cross society!" protested Rica, holding up her hands in feigned amazement, while Jane blushed hotly, with chagrin at the assumption. In the presence of her sister-in-law, Jane comprehended that their offer, in place of being an act of graceful condescension, was a piece of intolerable officiousness.

"Those notabilities — and greater than they — may be seen elsewhere and at another time," said Pleasance with equanimity. "And what should I do with an introduction to society like that of Stone Cross? I should be out of my element in it. If you can understand me, I have no desire for it. Indeed, it is possible to be without social ambition." As she relieved herself by the declaration, a faint flavor of frankness and friendliness stole into her manner, and she ended amicably, "It is otherwise with you, who have been brought up differently."

"You are hard upon us," complained Rica, as she and Jane rose to go. "You mortify us dreadfully by drawing these strong lines, entrenching yourself behind them, and not caring to stir beyond them. Of what good is our gain, if we cannot make you court it?"

"That you must discover for yourselves," said Pleasance, laughing for the first time; "but I did not draw the lines, I found them already drawn; I only keep within them; that is my place."

But Pleasance did not think it her place to let her visitors go without offering them luncheon; and when they declined it, she failed to ring for Perry to show them out. She went with them, unwelcome intruders as she had counted them, to her door, opening it for them, and shaking hands on the threshold.

When that was done, Pleasance retreated within the fastness of her own room, shutting and bolting the door, even against the consummate prudence of Mrs. Perry, and sat down to think with piteous regret. "They had no business to come; I did right to resent their coming. But if, after they came, the sister had but had a look of the brother — if she had once spoken of him, so that I might have heard what he was doing, and whether or not he was happy. He did not look happy when I saw him last, but it could not be expected then. I know he had a happy nature, though he was easily pained by another's pain. Oh! if I had not crossed his path!"

"What do you make of her?" inquired Rica inquisitively, the moment the door was closed. "I do not believe one bit, Jane, that your sister-in-law is the genuine article — the ordinary village girl. She posed me from the beginning; but now it would be too ridiculous to be taken in by her. Did you notice what she could not help showing — that she knew Victor Hugo's novel? Depend upon it that she belongs to some of those queer sects who think it Christianity to level all social distinctions, and to delve and milk cows with their own hands. If it were attempted for a lark, I could understand it; but then they profess to be in earnest."

"I don't think you have grounds for such a supposition, Rica," said Jane gravely, not looking particularly cheered by the explanation.

"My dear, I assure you these worthy men and women are only fools — not rogues, though they may look like them,"

Rica told Jane. "Your sister-in-law's socialism is not even on the French model, for she comes to church, and says her prayers like a common sinner. The English brotherhoods and sisterhoods simply borrow and adapt a fragment or two, here and there, fitting them to what the latest founders reckon an apostolic pattern. But doesn't this view, as well as her beauty, account for Archie's subjection? his *rôle* was that of a reformer, and if he had played it out at all consistently, he should have been ploughing, not the sea, but his own fields, like another Cincinnatus, by this time."

"You are hard upon Archie," said Jane in her perplexity and vexation.

"Not at all," maintained Rica, "and it is an ill wind which blows nobody good. If Archie had been faithful to his convictions, and if he clave to his wife, as one would have expected of so peerless a knight, and if the two worked together, where would you and your mother be at this moment? Very likely cooking your own dinner and cleaning your own shoes, if you still wore shoes; and I might have been drawn into the vortex — not that I should have minded, for a spell, to see how the rest of you got on. Besides, it might have been the undiscovered process, I am always in search of, for reducing this too, too solid flesh, or fat. I might have had the great gratification of retiring from the society of 'Universal Helpers,' or 'Free-will Stone-breakers and Charwomen,' a permanent whipping-post."

Jane withdrew from the encounter, cured of the conceit of being a peacemaker between an alienated husband and wife, even though they were her brother Archie and her misunderstood sister-in-law — entirely cured of the fancy of her superiority to Mrs. Archie, and her capacity for reversing their positions, and chaperoning the matron in society.

Jane was honorable in all her ways, with the strict scrupulous integrity of the best-brought-up English girls. She made no concealment of the visit she had paid, nor did she leave it to come out in Rica Wyndham's good stories, adorned with the colors which that young lady laid on lavishly.

"It is all very sad, but she has brought it on herself, and no doubt she does not wish it altered," remarked Mrs. Douglas with her usual toleration. "Absurd in Perry to allow such a report to get into circulation, not to say to originate it! Of course that was one of Rica Wyndham's *canards*. I shall put a stop to that at once; but it is all we can do, my love. You have seen for yourself that it is not for us to interfere and take up poor Archie's — to support her in the line of conduct, very likely, which drove him to separate from her."

"But, mamma, Archie must have known it all before. Do you think he was warranted in giving her up, though she was rustic and odd, and would not go into society — wore brass thimbles and did seamstress's work, and kept common birds' cages on her piano — even though she went into a field and pulled out by her unaided strength, 'a ram caught in a thicket,' Rica Wyndham called it?"

"My dear," said Mrs. Douglas softly, "I do not wish to hear any more of the poor, handsome, half-educated creature's delinquencies. For anything more, I am thankful that it is not for me to condemn, or even to judge the conduct of my own children — of my poor rash boy, who has made such a fatal mistake in his bright life."

Mrs. Douglas renewed her private resolution that her dear little daughter, who was so sensible, only a little precocious, and carried away by inexperience and warmth of family affection, should be kept in future far apart from Stone Cross and its objectionable associations. To render assurance doubly sure, Jane should never again be entrusted in her impulsive youth to the care of the good, oblivious Russels, or of kind, easy Mrs. Tuffnell, above all, to the companionship of that arrant marplot and mischief-maker, Rica Wyndham.

From The Cornhill Magazine.

WHEN THE SEA WAS YOUNG.

IN TWO PARTS.

PART II.

WHEN our earth's deep atmosphere bore the waters of her present seas floating aloft in the form of vast cloud-masses above her fiery surface, a remarkable peculiarity of appearance must occasionally, though perhaps only as a rare phenomenon, have been observable. Suppose that, while a telescopist on Venus or Mercury was contemplating the earth, one of those rapid changes described in the preceding part affected cloud-layers forming the earth's visible outline at the moment of observation. The earth's apparent figure would then not only be distorted by the change, but the actual progress of the

change would take place under the observer's eye. Most probably no change of the kind could have been detected by direct observation, many circumstances with which telescopists are familiar rendering an observation of the kind peculiarly difficult. But supposing the observer to have watched the earth when the moon was about to pass in transit across her face, and that the moon appeared at the moment close to that part of the earth's outline where such changes were taking place; then it would be possible, on account of this favorable conjuncture, to recognize the change of outline. For instance, if the apparent outline chanced to be raised above its usual position when the moon was very close, the two outlines — that of the moon and that of the earth — would seem to be in contact before they really were; but if, just at that time, the high cloud-layer which formed the raised part of the earth's outline were rapidly to disappear, then her outline would shrink in that place, and no longer appear to touch the moon's. Or again, it might happen that an observer of the moon, watching the great globe of the earth as it moved over the star-strewn heavens, would see its outline pass over and conceal some conspicuous star, but in a few minutes perceive the star reäppearing outside the same part of the earth's outline. The observer would then know that the outline must have shrunk. In these and like ways observers outside the earth might in those remote times have seen the evidence of very active processes of change taking place in her deep cloud-laden atmosphere.

Now appearances such as these cannot be expected to occur frequently in the case of Jupiter or Saturn. The changes themselves which could alone produce them are infrequent, and the conditions under which the changes could alone be detected occur but seldom; so that the chance of a change occurring just where and when it could be detected are very small indeed. Yet in one case certainly astronomers have detected just such a change in the outline of Jupiter. It would be difficult — nay, we venture very confidently to say that *it is impossible* — otherwise to explain what is described by the late Admiral Smyth, one of the most careful and skilful of modern astronomers: "On Thursday, June 26, 1828," he says, "the moon being nearly full and the evening extremely fine, I was watching the second satellite of Jupiter as it gradually approached to transit its [the planet's] disc. My instrument was an excellent refractor, of three and a quarter inches aperture, and five feet focal length, with a power of one hundred. It appeared in contact at about half past ten, by inference, and for some minutes remained on the edge of the limb" (that is, on the outline of the disc), "presenting an appearance not unlike that of the lunar mountains coming into view during the first quarter of the moon, until it finally disappeared on the body of the planet. At least twelve or thirteen minutes must have elapsed, when, accidentally turning to Jupiter again, to my astonishment I perceived the same satellite *outside the disc*. It was in the same position," as to level, "where it remained distinctly visible for at least four minutes, and then suddenly vanished."

This narrative is so surprising, even when explained in the simple manner which our theory of Jupiter's condition suggests, and still more so on the usual theory of Jupiter's condition, that it may be well to pause for a moment to inquire whether there may not have been some mistake. Admiral Smyth was a skilful observer, as we have already stated. His statement alone would have great weight. Still one may admit the bare possibility of an optical illusion, similar to what is described in Brewster's "Natural Magic," the satellite seen after the immersion being a mere trick of the mind, a "blot on the brain which would show itself without." Smyth himself supposed so, for he says: "As I had observed the phenomena of Jupiter and his satellites for many years, without any remarkable irregularities, I could not but imagine that some optical or other error prevailed, especially as the satellite was on this" (*i.e.* the hither) "side of the planet." And probably the phenomenon thus dismissed by Smyth himself would not have been heard of, but for the fact that two other observers chanced to witness it. "A few days afterwards," proceeds Admiral Smyth, "I received a letter from Mr. Maclear, Biggleswade, informing me that he had also observed the same, but that he had considered it a 'Kitchener's wonder'" (old Kitchener, the telescopist, having been apt to recount every optical illusion by which he was perplexed as a real phenomenon). "And about the same time," adds Smyth, "Dr. Pearson, having favored me with a visit, asked me whether I had noticed anything remarkable on the 26th; for that he had, in accidentally looking at Jupiter, *seen the second satellite reappear!* Here, then, were three observers, at dis-

tant stations, with telescopes of different apertures, all positive as to the extraordinary deviation from rule. It may be borne in view that Biggleswade is twelve miles from Bedford" (the place of Smyth's observatory; and South Kilworth, Dr. Pearson's residence, is thirty-five). Mr. Maclear's telescope was rather smaller than Admiral Smyth's; while Dr. Pearson's was a much more powerful instrument, twelve feet long, and nearly seven inches in aperture. "Explanation," calmly remarks Mr. Webb, in speaking of this phenomenon, "is here set at defiance; demonstrably neither in the atmosphere of the earth nor Jupiter; where and what could have been the cause? At present we can get no answer." But it is not the part of the true student of science thus to resign the attempt to explain a phenomenon merely because it is unusually perplexing. In this case we can reason directly from the observed fact to its interpretation, apart from those *à priori* considerations which in the present essay have led us to regard such a phenomenon as one to be looked for in Jupiter's case. First, the observation was certainly not an optical illusion, for three persons made it independently; secondly, it was demonstrably not due to terrestrial atmospheric causes, for it was seen from three stations far apart; thirdly, it was demonstrably not caused by any action of Jupiter's atmosphere on light proceeding from the satellite, for the satellite was between Jupiter and the observer; fourthly, the satellite cannot really have stopped, gone back on its path, and then resumed its onward course, unless the laws of nature were suspended — a theory we may dismiss in a scientific inquiry; for a similar reason, fifthly, we may dismiss the idea that the whole mass of Jupiter moved in abnormal fashion. There remains only one possible interpretation — viz., that the outline of Jupiter's disc had changed in position; in fact, in whatever way we explain *how* this happened, the observations may be regarded as proving unmistakably that it *did* happen.

Now the supposition that Jupiter's outline altered leaves us still much to wonder at. For let us consider the extent of change necessary to account for what was observed. Smyth may have been mistaken as to the time-intervals he mentions in his account, since he does not seem to have taken them from the clock. The interval, which he supposed to have lasted twelve or thirteen minutes, may in reality not have lasted more than five or six; and the time during which, after reappearing, the satellite continued visible, may not have lasted more than two minutes instead of four, as roughly estimated. But, taking only eight minutes as the total interval between the first and second disappearance, we have to account for marvellous changes in the apparent position of the planet's outline. For in eight minutes the second satellite would travel about four thousand miles, and the outline of Jupiter must have changed by that amount, seeing that at the first disappearance the visual line to the satellite just touched the planet's apparent edge, while at the second disappearance the visual line to the second position of the satellite, four thousand miles from the first, touched the planet's edge in its now changed position. Probably the difference was even greater; Smyth's own estimate of the time would make it at least eight thousand miles: but four thousand miles will be enough to deal with. It is not necessary to suppose that the planet's apparent outline, *as ordinarily seen*, shrank inwards by the whole of this amount. More probably the outline bulged beyond its normal position at the time of the first disappearance, and presently shrank below its normal position, bringing the satellite again into view, and remaining thus depressed until the second disappearance had taken place. We may suppose, then, that at the beginning the surface forming the apparent outline was (at the place where the satellite's transit began) about two thousand miles above the usual mean level, while afterwards it was much below that level. Two thousand miles being less than the fortieth part of the diameter of Jupiter, we can readily understand why even so enormous an apparent expansion or contraction should not have noticeably affected the symmetry of the planet's apparent figure. Indeed, with ordinary telescopic power the outline of Jupiter is so expanded by irradiation, that much greater changes of level would be so far masked as to escape attention. But we are not greatly concerned to reason at this stage as though the theory that the planet's outline changed required to be defended against objections. For it is absolutely certain that the outline must have changed. The visual line to the satellite certainly passed several thousand miles nearer the planet's centre at the time of the first disappearance than at that of the second, yet in both cases touched the apparent outline, which must therefore have shifted by as many thousands of miles, unless the satellite itself had stopped

and retreated, or the whole bulk of the planet had shifted; neither of which events could occur except by a miracle. Now the changing of the outline, though marvellous, is not miraculous, and, being demonstrably the only non-miraculous interpretation of the observed event, must be accepted as the true interpretation — the event itself, observed as it was by three skilled astronomers, having certainly occurred.

This being so, the outline of Jupiter having certainly changed for a while on that particular occasion, which theory, we would ask, should be rejected as fanciful and sensational — the ordinary theory, according to which the solid crust of Jupiter must, after rising two thousand miles at least, have sunk through four thousand miles? or the theory that a cloud-layer, floating at least two thousand miles above the usual level of the highest visible cloud-layer of Jupiter, melted quickly into the form of invisible vapor, and thus a layer lower than usual by as many thousand miles came into view, forming for the time the planet's apparent outline in that place? According to the first theory, a surface much larger than the whole surface of our earth sank through a depth greater than the whole distance from the earth's surface to her centre. The intense heat which is regarded with such disfavor by followers of the old-fashioned ideas (really based on the Ptolemaic astronomy), if it had had no existence before, would have been generated by so tremendous a downfall, which indeed could not have taken place without vulcanian heat, exceeding in intensity what the other theory presents as the natural consequence of Jupiter's mode of formation. According to this second theory, the rising of the cloud-layer even to so great an elevation as two thousand miles above the usual level of the highest Jovian clouds, was an exceptional phenomenon indeed, but by no means incredible; while the rapid dissipation of the cloud was not only quite easily to be explained, but corresponded with changes which have been observed to take place among cloud-layers seen on the disc itself. If a vast cloud-layer can disappear in a few minutes from view, above one part of the planet's surface, so also it can above another. One part may chance to lie on the visible disc of the planet; another may chance to lie on the edge of the disc; for these parts of the disc only bear relation to our point of view, not to the planet itself; and while a change occurring in one part would make a belt or spot seem to form or disappear, one occurring in the other position would make the apparent outline of the planet seem to bulge or shrink, as the case might be. Nay, we may add one consideration which would render the dissipation of a high cloud-layer in the position where Jupiter's outline appeared swollen even more naturally to be accounted for than the often observed dissipation of a cloud-layer on the disc itself. For the cloud-layer which vanished on that occasion had just been carried into sunlight by the planet's rotation; and we can readily understand how the solar heat, slight though its effects may be compared with those of Jupiter's own internal heat, might bring about the dissolution of a cloud-layer which chanced to be in that critical stage where a slight cause would bring about either rapid formation or rapid dissipation of visible cloud.

The chief difficulty, of course, in the theory, or rather the most surprising result of the demonstrated fact that Jupiter's visible cloud-layer thus changed, resides in the enormous depth we have to assign to the cloud-supporting atmosphere. We have already shown in these pages that, *ceteris paribus*, the atmosphere of Jupiter would be much shallower — layer for layer — than our earth's, simply because the planet's mighty attractive power would more strongly compress it. That it is manifestly not thus compressed indicates, as we then showed, the intensity of the heat pervading its whole extent. But that it should range to a height of thousands of miles above the true surface of the planet, does certainly seem at first amazing. Yet be it remembered that not only is such an inference demonstrably correct, as we have just shown, but it also follows necessarily from the comparison already instituted between Jupiter and the earth in respect of mass and density. If we assign to the solid globe of Jupiter the same mean density as the earth has — or, rather, if we imagine the totality of material, whence millions of years hence his solid globe is to be formed, gathered into a globe having the same mean density as the earth — we find for this globe a diameter of fifty-three thousand miles, less than his present apparent diameter by nearly thirty-two thousand miles; so that the level of his surface in that condition would lie sixteen thousand miles below his present surface, the space between the two surfaces, or the total shrinkage of Jupiter's volume, amounting to about nine hundred and thirty times the volume of

this earth on which we live. As we have every reason to believe that (in a general sense) all the planets are constructed of the same materials not very differently proportioned, we are compelled to admit this vast expansion of Jupiter's present dimensions, and can therefore very well understand even such mighty changes of apparent surface-level as the observation of Admiral Smyth, Sir T. Maclear, and Dr. Peacock certainly shows to have taken place.

But now, reverting to our earth's history during the period corresponding to that through which Jupiter is now passing, let us now consider whether the ocean, converted by heat into great cloud-masses floating through hundreds, if not thousands, of miles above the glowing surface-crust, would not produce yet other appearances such as distant observers might have been able to note.

When the shadow of the moon falls now upon the earth during a solar eclipse, it may either wholly or in part reach the actual surface of the earth, or be intercepted partly or wholly by cloud-layers. If an observer on Venus or on Mercury were to watch the earth when undergoing eclipse in this way, the apparent shape of the shadow would not be in any appreciable degree modified by such variations in the manner of the shadow's fall, unless very powerful telescopes were employed. For the cloud-layers of our air lie but a few miles above the surface of the earth,* and the apparent displacement of a part of the moon's shadow, intercepted by a cloud-layer, would be correspondingly small, and in fact undiscernible from Venus or Mercury. But if the atmosphere were very deep, and the cloud-layers separated from each other and from the earth by hundreds of miles, the case would be different. To illustrate the nature of the appearances which might be expected, let us consider the case of a balloon suspended in full sunlight above a layer of fleecy clouds, the layer intercepting a portion of the sun's light, but not all of it. If the layer intercepted all the sun's light, then, of course, a shadow of the balloon would be thrown upon the cloud-layer, this shadow appearing as one, whether seen from the balloon itself, or from the higher parts (let us say) of a lofty mountain reaching far above the layer of clouds. But, the layer not intercepting all the light, a portion of the rays pass on to illuminate the ground everywhere except where the balloon has intercepted the sun's rays. That is to say, there is another shadow on the ground upon the prolongation of lines drawn from the balloon to the shadow on the clouds. These two shadows seen from the balloon itself would appear as one, both lying in the same direction; but they would be separately discernible from a station on the mountain height. Neither would appear quite black; for the higher would lie on clouds through which the observer would receive light from the illuminated ground below, which he would partially see, while the lower shadow would be seen through the illuminated cloud-layer whose light would partially conceal the blackness of the shadow. If the cloud-layer were *very* thin, the upper shadow would be the least distinct; if the clouds without being dense yet suffered but a small quantity of direct sunlight to pass between and through their fleecy texture, the upper shadow would be very dark, the lower scarcely visible. Now replace the balloon by the moon, and the observer upon the mountain height by a distant astronomer on Venus or Mercury, and we perceive that at times, when (in the distant period we are considering) the shadow of the moon fell on a very lofty layer of fleecy clouds, while the shadow so falling would be plainly visible, another fainter one would be discernible on a lower cloud-layer, whose existence and relative position would in this way be indicated to the thoughtful observer. *Or*, if many layers of thin and fleecy clouds, or a single deep layer of such clouds, existed, then either a set of shadows getting fainter and fainter at each successive layer* would be seen, or else a long cone of shadow passing through the range of the deep cloud-layer.

Now let us see whether Jupiter, the most conveniently placed of all the younger planets for purposes of observation, shows such appearances as these. Let it be premised that *ordinarily* we could not expect to see them, except on very rare

* Much less is known than might be respecting the height of the loftier cloud-layers. Coxwell and Glaisher, in their highest aërial flights, saw the cirrus clouds apparently as high above them as when seen from the ground. The height of such clouds could be quite easily determined by taking photographs, with suitably adjusted instruments, from either end of a measured base-line a mile or two in length.

* The shadows themselves would not grow fainter and fainter, but would be black right through the range along which they would lie; for no part of the sun's rays would reach any one of the spaces in shadow. But seen as they would be through partially transparent cloud-layers, and seen also as the partially illuminated cloud-layers would be *through* the shadows, these necessarily would grow less and less distinct the deeper they lay.

occasions, when some exceptionally thin and fleecy cloud-layer, lying very high, received the first shadow, allowing another to be formed on a cloud-layer lying many hundreds of miles below. It would probably be as rare to detect such appearances, supposing them specially searched for (which has never yet happened), as it would be to observe such a phenomenon as the reappearance of a satellite. And manifestly the lower shadow must be hundreds if not thousands of miles below the upper to be separately seen, since the shadow of a satellite would be about two thousand miles in diameter, and the earth is so close to the sun compared with Jupiter that the line of sight to the planet is never more than slightly inclined to a line from the sun to the planet. Manifestly, if we looked exactly in the same direction as the sun's rays fall, we should not see the shadow at all; looking in a direction slightly inclined, we see the shadow thrown somewhat on one side of the satellite (never *very* far); a lower shadow would be thrown somewhat farther in the same direction, but only (in proportion) very slightly. To be thrown as much as two thousand miles on one side so as to seem clear of the first shadow, the distance of the lower layer from the upper must be several thousand miles. As for seeing such a cone of shadow as is referred to in the last sentence of the preceding paragraph, that could scarce ever happen. In fact, if the requisite conditions existed, the chances would be that the lengthened shadow would be too faint to be seen at all. In like manner it might chance that where in reality there was a second shadow it would not be discernible, and the only perceptible effect be that the first shadow would not appear so dark as usual. Probably, on the whole, these being the actual conditions, the reader may consider that it should be all but hopeless to look for any such phenomena as we have referred to, among the recorded observations of the planet.

Let us see how this may be, however. Turning to Webb's little work, "Celestial Objects for Common Telescopes," in which we may always expect to find the record of uncommon telescopic observations, we come across the following interesting passage: "Cassini once failed in finding the shadow of the nearest satellite when it should have been upon the disc. Gorton saw it grey on one occasion. The shadow of the second satellite has been seen specially indistinct by Buffham, Birt, and Grover. South many years ago published in one of the public journals a most interesting observation, which I greatly regret that I cannot recover; but I am confident as to its tenor, which was, that in his great telescope he perceived each of two shadows of satellites on Jupiter to be attended by a faint duplicate by its side, traces of which could be just detected with a smaller telescope of (I believe) five feet" in focal length. Again, in Chambers's "Descriptive Astronomy," it is stated that "on April 5, 1861, Mr. T. Barneby saw the shadow of the third satellite first in the shape of a broad dark streak such as the cone of the shadow would present in a slanting direction, 'but it shortly afterwards appeared as a circular spot, perfectly dark.'"

Yet one other observation pointing in the same direction. If the lower shadow of a satellite can be at any time distinguished from the upper, then, should a great cloud-mass be floating at the higher level, *its* shadow ought to be similarly discernible, projecting to the same extent from under the cloud itself; which would hide the greater portion, but not all, of its own shadow. Now Mr. J. Brett, the eminent landscape-painter, who from time to time employs his eye, well cultured to discern varieties of tint, upon the celestial bodies, wrote thus in a paper read before the Astronomical Society in May, 1874: "I wish to call attention to a particular feature of Jupiter's disc, which [the feature, that is] appears to me very well defined at the present time, and seems to afford evidence respecting the physical condition of the planet. The large white patches which occur on and about the equatorial zone and interrupt the continuity of the dark belts are well known to all observers, and the particular point in connection with them to which I beg leave to call attention is that *they cast shadows;* that is to say, the light patches are rounded on the side farthest from the sun by a dark border shaded off softly towards the light, and showing in a distinct manner that the patches are projected or relieved from the body of the planet. The evidence which this observation is calculated to afford refers to the question whether the opaque body of the planet is seen in the dark belts or the bright ones, and points to the conclusion that it is not seen at all in either of them, but that all we see of Jupiter consists of semi-transparent materials. The particular fact from which this inference would be drawn is that the dark sides of the suspended or projected masses are not sufficiently hard or sharply defined for

shadows falling upon an opaque surface, neither are they sharper upon the light background than upon the dark." This point Mr. Brett proceeds to deal with by reasoning which has a special value because relating to a subject in which he is an expert. "The laws of light and shade upon opaque bodies," he remarks, "are very simple and very absolute; and one of the most rudimentary of them is that every body has its light, its shade, and its shadow, the relations between which are constant; and that the most conspicuous and persistent edge or limit in this association of elements is the boundary of the shadow; the shadow being radically different from the shade in that its intensity is uniform throughout in any given instance, and is not affected by the form of the surface on which it is cast, whereas the shade is distinguished by attributes of an opposite character. Now if the dark spaces adjoining the light patches on Jupiter, which I have called shadows, are not shadows at all, but shades, it is obvious that the opaque surface of the planet on which the shadows should fall is concealed; whereas, if they are shadows, their boundaries are so soft and undefined as to lead to the conclusion that they are cast upon a semi-transparent body, which allows the shadow to be seen, indeed, but with diminishing distinctness towards its edge, according to the acuteness of its angle of incidence. Either explanation of the phenomenon may be the true one; but they both lead to the same conclusion — namely, that neither the dark belts nor the bright ones are opaque, and that if Jupiter has any nucleus at all, it is not visible to us. . . . By the kind invitation of Mr. Lassell I had an opportunity, on the 20th of April, of examining the disc with his twenty-feet reflector of two-feet aperture, and I found this large instrument confirm my impressions concerning the shadows in the most satisfactory manner."

There remains one peculiarity in the appearances resulting from the earth's condition during the remote period we are dealing with, which might possibly, though perhaps *barely*, have been detected by observers on Venus or Mercury. The shadow cast by the earth upon the moon — that is, the true shadow, not the mere penumbra — has a round shape, corresponding to the fact that the body casting it is a globe. But of old, when irregular cloud-masses and cloud-layers, various in shape and extent, were suspended in the deep atmosphere of our planet, it must necessarily have happened that at times the outline of the shadow was irregular, and that in a marked degree. The irregularity, in fact, would correspond closely in degree with the occasional irregularity of the earth's apparent figure arising from the same cause (though it is possible that it might have been at times more clearly discernible, as not affected to quite the same degree by irradiation). Now here is a peculiarity which we could not expect to recognize in the case of our heretofore chief test-planet, Jupiter. No telescope yet made by man, probably no telescope man ever will make, would show peculiarities in the shape of Jupiter's shadow on one of his satellites. No one has ever yet claimed to have seen the outline of that shadow at all, far less to have been able to discern its true shape; and it is not likely that any one ever will. But in this case the planet Saturn may help us; for *his* shadow is not merely cast at times upon the small discs of his distant moons, but rests constantly upon the broad expanse of his mighty rings, —

> While Saturn whirls, his steadfast shade
> Sleeps on his luminous ring, —

and that shadow we can study, despite the vast distance of the planet, with a fair chance of detecting peculiarities in its shape, should such at any time exist.

Let it be noticed at the outset that it is perfectly easy to calculate what the shape of the shadow *should* be, if Saturn were a solid globe and the rings' surface perfectly flat. The astronomer knows that at one time, on these assumptions, the shadow would be hidden, at another visible above or below the planet's globe; at one time to the east of the globe, at another to the west, and always with an elliptical (but very nearly circular) outline, not quite sharply defined, but with a slight fringe of shading only discernible in powerful telescopes. In like manner we may note, in passing, that the shape of the rings' shadow on the globe would always be calculable; and we know that, when visible at all, it should appear as a black curved streak, either above or below the ring, and perfectly smooth in outline. Again, whatever irregularities there may be in the level of the rings can very little affect the apparent shape of either shadow, because we know from the edge view of the rings that such irregularities are slight compared with the thickness of the rings, which itself is not great. So that any irregularities of a marked character in either shadow must be referred to that

cause alone which is competent to produce them; viz., irregularity in the cloud-layers and cloud-masses floating in the deep atmosphere of the planet.

So much premised, let us see what the records gathered by astronomers have to tell us on this point. We turn to a series of papers on the planet Saturn in the *Intellectual Observer* for 1866, by Mr. Webb, and we find the portion relating to the shadows opening thus: "From an early period, irregularities have been remarked in the form of the shadows which the globe and ring mutually cast upon each other." Mr. Webb deals first with the shadow of the ring, with which at present we are not directly concerned; though, of course, any irregularities in that shadow, like the irregularities in the shadows of Jupiter's moons, already described, indicate the depth and the occasionally irregular arrangement of the cloud-envelopes. Mr. Webb, in fact, after describing such irregularities, rejects, first, the theory that they are caused by irregularities in the ring; secondly, the theory that the globe's surface is irregular; and, thirdly, the theory that the ring has an atmosphere through which the sun's rays are irregularly refracted, — in fine, "passing over this difficulty as insoluble," which is not a very satisfactory result. Going on to consider the shape of the shadow of the planet on the rings, he mentions, first, how such first-rate observers as Sir W. Herschel, Lassell, Dawes, and Secchi saw the outline of the shadow concave, instead of convex. Next, Dawes on one occasion saw the shadow irregular in outline where it crossed the bright ring. In October, 1852, Lassell saw the shadow on *both* sides of the globe. The younger Bond, of Harvard, Mass., saw the same; on November 2, saw the shadow *winged*. November 3, Tuttle saw the shadow on both sides, on which he naïvely asks: "What can this mean?" On November 29, De la Rue saw the shadow on both sides, and wrote: "This is very remarkable, but there can be no question as to the fact;" both shadows looked "like objects seen by mirage" — a remarkable expression. Then we find these observers, and others of equal repute, describing the shadow as having horns, ears, a "roof" (pictured with two projecting eaves), an inlet, a single ear, a reversed edge. Secchi writes: "*L'ombre assez curieuse, elle est renversée et ondulée.*" On one occasion Bond saw two shadows — one black, the other "a narrow, ghost-like shade." Of this faint shadow he says: "I was much impressed by the fact that the outline was preserved perfectly, while the intensity of the shadow was very feeble." Was not this *certainly* either the faint shadow of a deep, partially transparent cloud-layer, or a dark shadow seen *through* such a layer?

After enumerating a number of such cases, Mr. Webb proceeds: "Thus far extend our facts. What shall we say in explanation of them? Can we charge them upon personal or instrumental peculiarities?* It seems not possible, since, in the main, they are agreed upon in England and Italy, and Malta, and India, and the United States. Some of the most singular statements, it is true, come from America alone. But, as they have often the concurrence of more than one observer, so the optical capacity of a telescope, which in favorable air would bear distinctly a power stated to be fifteen hundred and sixty, leaves small chance of appeal." (He might have added that the American astronomers were second to none in observing skill, and that the American skies are particularly favorable for observations of the class in question.) "In fact, it is," Mr. Webb proceeds, "a remarkable circumstance that the mystery of the subject has increased under closer, more powerful, and more extended scrutiny. Some of the phenomena may admit of a more or less probable solution. For instance, the apparent concavity of outline might be explained as a deception similar to those optical perversities illustrated by Mr. Proctor," in an article on Saturn's square-shouldered aspect. "But the 'ears' projecting, even when the true shadow was invisible — the two shadows, when one only should have been seen — the 'roof' and 'inlet,' and the varying depths of shade in different parts, are alike too clearly attested for doubt, and too incomprehensible for explanation." (*Cela dépend.*) "We might take refuge to a certain extent in the idea of varied curvatures in the shadowed surfaces; and, in order to meet the objection arising from the evanescent thinness of the rings," we might "speculate on some force emanating from the sun disturbing the level of the rings. But even after we have ventured this daring" (and, in fact, impossible) "effort, we find other features as intractable as ever. Some things look like effects of an atmosphere very irregularly distributed round the ball, and possessed

* We have altered a word here, and perhaps marred the sentence; but the original word "equation" would have no meaning for many readers of these pages.

of properties greatly dissimilar to those of ordinary gases; but this is undiscoverable, just where it ought to be most apparent," where the remoter parts of the ring meet the outline of the disc obliquely.

But there is not one of these phenomena which cannot be explained by the theory of a very deep atmosphere, not "irregularly distributed," or "possessing properties greatly dissimilar to those of ordinary gases," but irregularly laden with cloud-masses. In fact, these occasional peculiarities in the shadow are thus brought into exact correlation with the peculiarities observed occasionally in the planet's shape, as noted in the first part of this paper.

We might note here other circumstances in the earth's youthful condition. For instance, from time to time the ruddy glow of her intensely heated surface must have been visible through breaks in her cloud-layers; and just such occasional views of Jupiter's heated surface seem to have been obtained on those occasions when the usually cream-white equatorial belt has shone with a ruddy color. But this consideration, and others connected with the quantity of light received from Jupiter and Saturn, have already been dealt with at considerable length in these pages.

It appears to us, in fine, that all the evidence, both *à priori* and *à posteriori*, corresponds with the theory which we have brought before the reader, that a planet, during its extreme youth, has its oceans floating in the form of cloud-masses and cloud-layers in a very deep atmosphere. We have seen reason, first, for believing that the intense heat of a planet, for many ages after its first formation, would keep the oceans in this cloud-like condition. Then, looking around for planets such as we might suppose to be much younger than the earth, we have seen that Jupiter and Saturn, the giant planets of the solar system, are probably the youngest (in this sense), always excepting the sun, which is in an earlier stage than any member of his family. And, considering what appearances a planet with a very deep cloud-laden atmosphere might be expected to present, we have found that just such appearances are presented by the planets Jupiter and Saturn, the phenomena described not being seen at all times, but occasionally, and in varying degree, precisely as we should expect from the variable causes producing them. We have also seen that the small density of the giant planets cannot readily be otherwise explained than by the theory that we do not see their real surface, but the outer surface of cloud-layers enveloping them. Moreover, while not a single fact known about the great planets is opposed to this theory, there are some facts, as we have seen, which cannot *possibly* be explained on any other theory. But when so much as this can be said of any theory, the theory may be regarded as established.

When the earth and sea were young, then, the earth's whole frame was intensely heated. Her real surface was doubtless partly solid and partly liquid then, as now; but the solid portion glowed with ruddy and in places with white heat, while the liquid portions, instead of being water, as now, were formed of molten rock. Above this surface, with its "tracts of fluent heat," was the fiery atmosphere of that primeval time, enormously deep, complex in constitution, bearing enormous masses of aqueous vapor, and every form of cloud and cloud-layer, swept by mighty hurricanes whose breath was flame, drenched with showers so heavy that they might rather be called floods, and tortured by the uprush of the vaporous masses formed as these floods fell hissing on the earth's fiery surface.

After myriads of centuries came the time when the surface so far cooled as no longer to glow with ruddy light, and no longer to reject by vaporizing the waters which fell upon it. Then a fearful darkness prevailed beneath the still mighty canopy of cloud; for only little by little, by very slow degrees, would the water descend upon the earth's surface. Some, indeed, have thought that it was this stage of the earth's past which was described in the Bible words: "The earth was without form and void, and darkness was upon the face of the deep;" noting, in particular, that the coming of light (because of the descent of the waters upon the earth, according to this view) was followed by the separation of waters under the firmament from waters above the firmament (that

> Expanse of liquid, pure,
> Transparent, elemental air),

the waters under the heaven being next gathered together into one place, and so forth. But we must confess that this interpretation of the narrative, sometimes called the vision interpretation, seems to us very far-fetched and unnatural; though we are in no way concerned here to oppose it, deeming it only necessary to mention that, for our own part, we cannot doubt that the writer of the narrative wished to be understood as describing what really

occurred, not appearances shown to him in a vision.

A question which has long been regarded as among the great mysteries of nature — the question, How did the seas become salt — seems to us to find a ready solution when we consider that the ocean once formed the earth's cloud-envelope. We may, in fact, regard the oceans as holding in solution what was washed from the earth or otherwise extracted from its substance during the ages when the waters of ocean were passing from their former to their present condition. For then all the conditions assisted the action of the waters themselves — the intense heat of the earth's crust and the atmosphere, the tremendous atmospheric pressure, and consequently the high boiling-point (so that the waters first formed on the earth's heated crust must have been far hotter than is boiling water at the present time), and the presence also in the atmosphere of many vapors which would greatly help the decomposing action of the water itself. Consider, for instance, the following description, abridged from a paper by Dr. Sterry Hunt, the eminent Canadian chemist and geologist. After showing that carbonic acid, chlorine, and sulphurous acids would be present in enormous quantities in the primeval atmosphere, besides, of course, still vaster quantities of the vapor of water, he proceeds: "These gases, with nitrogen and an excess of oxygen, would form an atmosphere of great density. In such an atmosphere, condensation would only take place at a temperature far above the present boiling-point; and the lower levels of the earth's slowly cooling crust would be drenched with a heated solution of hydrochloric acid, whose decomposing action, aided by its high temperature, would be exceedingly rapid. The primitive igneous rock on which these showers fell probably resembled in composition certain furnace slags or volcanic glasses." The process of decomposition would continue "under the action of the heavy showers until the affinities of the hydrochloric acid were satisfied. Later larger quantities of sulphuric acid would be formed, and drenching showers of heated solutions of this energetic dissolvent would fall upon the earth's heated crust. After the compounds of sulphur and chlorine had been separated from the air, carbonic acid would still continue to be an important constituent of the atmosphere. It would be gradually diminished in gravity," through chemical processes resulting in the formation of various clays, "while the separated lime, magnesia, and alkalies, changed into bicarbonates, would be carried down to the sea in a state of solution."

Here we seem to see a fair account rendered of the enormous quantity of matter forming collectively what is called the brine of the ocean, and containing, besides common salt (chloride of sodium), sulphuric acid, magnesia, soda, sulphate of lime, and other substances. The theory that these substances have been washed from the earth's surface by causes such as are now in progress, would not, we think, be seriously entertained if the vast amount of matter thus present in the waters of the sea were remembered and considered. Brine forms, on the average, about 3 1–2 per cent. of sea-water. Hence, if we take the average depth of the ocean at two miles,* or, roundly, ten thousand feet, it follows that, if all the water of the sea were

* In Maury's "Physical Geography of the Sea" there is a passage which we take to be one of the most amusing ever written in a work of the kind. The idea would seem to have occurred to him of estimating how much surface the salts of the sea would cover to the depth of a mile; and while in the midst of the calculation, he would seem to have grown weary of it. At least we cannot otherwise understand how he came to pen the following singular remarks: "Did any one who maintains that the salts of the sea were originally washed down into it by the rivers and the rains ever take the trouble to compute the quantity of solid matter that the sea holds in solution as salts? Taking the average depth of the ocean at three miles, and its average saltness at 3 1-2 per cent., it appears that there is salt enough in the sea to cover to the thickness of one mile an area of *several millions of square miles.*" (The italics are ours.) This passage reminds us of one in an early volume of *Household Words*, where a very amusing account was given of the stores of wine in the London Docks, over which the writer is supposed to be shown, collecting materials, *but also tasting wine*, as he proceeds. The gradually increasing effect of the wine-tasting is indicated very humorously. In one of the later stages of his progress, the writer enters into a computation of the amount of wine wasted in the process of cleansing the glass with wine. (We write from memory, and possibly, as many years have passed since we read the passage, we may not be correct in details.) Assuming so much wasted at each cleansing, so many visitors, each tasting so many times, and so forth, "then," says the writer, "it may be shown that in each year eight hundred bottles, or it may be eight thousand bottles, of wine are wasted. And should any one object that there is a considerable difference between eight hundred and eight thousand, all we have to say is that the principle is the same," etc. Captain Maury passes on, however, without any allusion to the somewhat unexpected vagueness of his conclusion. "These millions of cubic miles of crystal salt have not made the sea any fuller," he proceeds. "All that solid matter has been received into the interstices of sea-water without swelling the mass; for chemists tell us that water is not increased in volume by the salt it dissolves. Here we have, therefore, an economy of space calculated to surprise even the learned author himself of the 'Plurality of Worlds.'" All which, so far as appears, is *apropos de bottes*. Within the same page, which, we submit, is inferior to Maury's usual style, we find him, in dealing with the question, What was the Creator's main object in making the sea salt? advancing the startling proposition that "all the objects of the salts of the sea are *main* objects." (The nature of the context, which is serious, even solemn, will not allow us to suppose that any pun was here intended.)

evaporated, there would be left a deposit of salt averaging three hundred and fifty feet in depth all over the present floor of the sea. This would correspond in quantity to salt covering all the present land surface of the earth to a depth of a thousand feet, or to a deposit *two hundred feet deep over the entire surface of the globe;* so that the idea of its having been washed from the land is altogether inadmissible. It may, indeed, be urged that, as the process of washing down from the land is continually going on, only a sufficiency of time would be needed to account for any quantity whatever of sea-salt. But apart from the fact that only a certain thickness of the solid crust, and that thickness by no means very great, could be drawn upon for the supply, and that the very continuance of the process shows us that even that portion of the earth's crust has not been drained of its salts, there is every reason to believe that the extraction of salt from the sea is going on and has been going on for many ages past at fully as great a rate as the addition of fresh salts. Although the process of evaporation cannot remove the salts, these, as Maury justly notes, can be extracted by other processes. "We know," he says, "that the insects of the sea do take out a portion of them, and that the salt-ponds and arms which from time to time in the geological calendar have been separated from the sea, afford an escape by which the quantity of chloride of sodium in its waters — the most abundant of its solid ingredients — is regulated. The insects of the sea cannot build their structures of this salt, for it would dissolve again as fast as they could separate it. But here the ever-ready atmosphere comes into play, and assists the insects in regulating the salts. It cannot take them [the salts] up from the sea, it is true, but it can take the sea away from them; for it pumps up the water from these pools that have been barred off, transfers it to the clouds, and they deliver it back to the sea as fresh water, leaving behind the salts it contained in a solid state. These are operations which have been going on for ages; proof that they are still going on is continually before our eyes; for the 'hard water' of our fountains, the marl-banks of the valleys, the salt-beds of the plains, Albion's chalky cliffs, and the coral-islands of the sea are monuments in attestation."

We must, then, regard the salts of the sea as in the main dissolved from the solid crust during that remote period when the seas were young. The seas thus indicate to us the nature of those vast chemical processes through which the earth had to pass in the earlier stages of its history. If the present crust of the earth did not afford, as it does, the clearest evidence of a time when the earth's whole frame glowed with intense heat; if we could not, as we can, derive from the movements of the celestial bodies, as well as from the telescopic appearance of some among them, the most certain assurance that all the planets, nay, the whole of the solar system itself, were once in the state of glowing vapor; the ocean brine — the mighty residuum, left after the earth had passed through its baptism of liquid fire, would leave us in little doubt respecting the main features at least of the earth's past history. The seas could never have attained their present condition had not the earth which they encompassed when they were young been then an orb of fire. Every wave that pours in upon the shore speaks to us of so remote a past that all ordinary time-measures fail us in the attempt to indicate the length of the vast intervals separating us from it. The saltness of the ocean is no minor feature or mere detail of our globe's economy, but has a significance truly cosmical in its importance. Tremendous indeed must have been the activity of those primeval processes, fierce the heat of those primeval fires, under whose action sixty thousand millions of millions of tons of salts were extracted from the earth's substance and added to its liquid envelope.

[Since this essay was in type, a paper has been read before the Astronomical Society by Mr. Brett, describing observations altogether inexplicable, except by the theory we have advocated above. They relate to the movements of two large white spots on Jupiter's chief belt. Both these spots were so shadowed as to indicate that they were in reality bodies of globular shape, — no doubt rounded masses of cloud, floating in the relatively transparent atmosphere of the planet. "The fact that they are wholly immersed in the semi-transparent material of the planet is indisputable," says Mr. Brett, "since they gradually disappear as they approach the" edge of the disc, "and in no case have been seen to project beyond it." The distinguishing peculiarity of these bodies was, however, their rapid motion, as though gaining on the planet's rotation. The average motion was estimated by Mr. Brett at about one hundred and sixty-five miles per hour, but this estimate would have been somewhat reduced had he taken into account, as he should have done, the changing position of the earth, relatively to Jupiter. Still, even after adding to this re-

duction all that can possibly be attributed to errors of observation, there remains a considerable motion of these cloud-masses, each of which was about half as large as the whole globe of the earth! It may, perhaps, be thought that we have here attached too much weight to the telescopic observations of one who is skilled rather in art than in science; and in fairness it must be admitted that about half Mr. Brett's observations have been regarded more than doubtfully by astronomers. But this observation, like the one described in the body of the above essay, depends only on accuracy in estimating the apparent position of two spots on the planet's face; and so skilful a draughtsman as Mr. Brett cannot have made any large error in an observation of the kind.]

From Blackwood's Magazine.

THE FRIEND OF THE HERO.

CHAPTER I.

THE BRUTAL LIFE.

"WHAT would the world be without passion?" asked Thomas.

"A better place," said Orlando, "and a healthier, as it would be without champagne."

"And romance?" asked Thomas, plaintively.

"Romance is to passion as the morning soda-water to the champagne of evening. We should be better without either."

"Thank heaven I don't take the trough view of the world," said Thomas, hotly.

"The brutal life for me," said Orlando, rolling over on the inn lawn. "I have had enough of culture for this year, and enough of society. Now I shall eat when I am hungry, and always have room for my elbows, dance when I feel light-hearted and always have space for my legs, burn my white ties, free my neck from the collar, and, above all, breathe air."

Here he filled his capacious lungs and stretched his long limbs, which were covered with spotless white flannel.

Thomas looked at his friend with an expression of disappointment and perplexity.

"Let us be brutal for a change," continued Orlando, with an air of moral earnestness; "or vegetable, and drink in sun and air. Waiter, a pot of ale."

When he had refreshed himself with a draught, he sprang to his feet, and said, "And now let us be off."

"I hope you won't think I am annoyed," said Thomas, anxiously, "but I think I should like to walk to-day, and join you this evening, if you don't mind sculling the boat down alone and taking my bag."

"I sha'n't expect to see you," said his friend, shaking his head with much solemnity. "In an hour you will be settled under a hedge with one of the ten volumes of 'A Placid Existence,' or 'Thoughts of a Suburban Grandmother,' or 'Gayer Moments of an Upper Tooting Curate,' or 'Gentle Dreams for Gentle Souls,' or — but enough. You see the effect of forcing such food upon me. I am suffering from a reaction. I am wedded to the brutal life." Then he laughed aloud, shook his friend playfully by the shoulders, and betook himself to the boat.

Thomas watched his friend as he rowed away, with an expression half-admiring, half-pathetic. It seemed very sad to him that so glorious a creature should be so hard of heart, strong, bright, and cold as a diamond. And yet he could not find fault with one who swung so grandly forward, filling his broad chest and straightening his shapely arms, and then with scarce an effort of strong back and thighs sent the boat flying along the water. Orlando shouted a farewell, and Thomas sighed and smiled, went indoors and paid the bill, and so started on his journey.

It was still early morning, and the dew was on the grass; the sky was not a pitiless blue, but tender and made softer by little fleecy clouds; and about the low green hills in the distance a wayward shower was sweeping. An April day had come to freshen the close of a thirsty June. The heart of the young wayfarer grew light, and his lips began to babble of little joys. Surely before the close of such a day something wonderful must happen. The fitful air was full of vague promises; each scent, as it grew fainter with the growth of day, hinted a memory too sweet for a regret. Thomas stepped out gay as a troubadour. The hours seemed endless before him, each moment a new joy, and surely somewhere a great surprise to crown the day. He thought with pity of Orlando, for whom no wonderful thing was reserved. He was full of whimsical thoughts, laughing and blushing now and then at his own absurdity. He pulled off his hat to the honeysuckle in the loose-growing hedge, and stepped aside from the path of a beetle, magnificent in green: he stopped to whisper to the sweet-brier rose, and to hear the sage counsel of a pragmatical finch. He lingered by the cottage porch, if haply some little damsel might step out to fasten the loose spray of roses. He

watched a light cart come jogging towards him, and wondered who was in it; till lazy Sally was jolted by in the sunlight, and he began to wonder if she had a lover. While his thoughts were yet busy with Sally, and he was humming some words of a girl, who was no lady nor beautiful, and who knew she ought not to walk with a gentleman; while he was musing on dairies and daisies and cool pastures and three-legged stools, and fancying Corydon with ribbons at his knees, and Bob Hulker in corduroy; and when the day was still young, — he heard the quick feet of ponies behind him, and before he had time to imagine a lovely driver, she had passed. Only a vision of soft, fair hair, a face half-curious, half-shy, but very sweet in shadow; and yet the young man thought that something remarkable had happened. He stood still and stared with the murmured song hushed on his lips. Away went the ponies, sleek, round, and sure of foot, happy in the thought of corn and in the light hand of their lady. Thomas pushed through a gap in the hedge, and ran up the sloping field, whence the hay had just been carted. From the high ground he looked far down the road, till the little carriage was but a speck in the distance. Then he sighed and solemnly shook his head, and then he looked across the country with a new sense of its loveliness. Fields of ripening corn stretched away from his feet to the banks of the delaying river. The wheat was scarcely stirred, and the hazy air was murmurous with the hum of insects. Beyond the river lay meadows where cows were lazily feeding — meadows which far away rose slowly and softly into grassy hills. The sky was tender as the memory of an old love-story — everywhere was rest; and the impressionable Thomas staring upward with wide eyes, gave himself up to dreams, and, dreaming, slept.

When Thomas woke the sun was high, and the charm of morning had passed away. He stretched himself, rubbed his eyes, and wrinkled his eyebrows plaintively. Then he stared down the road, and was absurdly disappointed because he could not see the pony-carriage. There was nothing but hot and dusty miles laid out before him, plain and monotonous as the path of everyday duty. He gave a great sigh, and braced himself for the work. As he plodded on, he began to think himself a very unfortunate young man. Nothing ever came up to his expectations. How different the day would have been, if those pampered ponies had taken fright, and he had flung himself at their heads! So his imagination busied itself with that which might have been. He fancied beauty in distress and heroism flying to the rescue. It did not occur to him that he might have been run over; but he was sure that he would not have minded a slight injury. Suppose, for instance, that he had sprained his wrist, and that she had bound it with her own handkerchief. Suppose — but, after all, life was a poor affair; and romance was of the dark ages: things never happened exactly right; and the day had grown oppressively hot.

For uneasy thoughts there is no cure like walking. Abuse of the age sank gradually into a mechanical accompaniment of the footsteps, and finally vanished before a growing consciousness of hunger.

When Thomas entered the low porch of the village inn he was tired and hungry, but the burden of the day was gone. He found Orlando lying on another lawn, and breathing the evening as he had breathed the morning air — a little browner and a little stronger, but otherwise unchanged. He had ordered a stupendous dinner, and had tried the beer.

"A good day?" asked Thomas, throwing himself on the ground by his friend.

"Great," said the other; "and you?"

"Yes," said Thomas, doubtfully; "good enough."

"By-the-by, I fished out a woman."

"A what?"

"I pulled a woman out of the water."

"You have saved a woman from drowning?"

Thomas felt a sinking. He had left Orlando for a day, and on that day Orlando had had an adventure.

"An old woman?" he muttered.

"I should guess about twenty."

"Dark?" Thomas thought he should not mind so much if she were dark.

"Fair, tall, and ——"

"Beautiful?"

"Women don't look pretty when they have just fallen into the water; but I think ——"

"You think she was handsome."

"Yes. Come and dine."

"Tell me how it happened first."

Thomas listened eagerly, while his friend told his story as quickly as he could.

About two hours previously he was drifting lazily down the stream, when he heard a cry. He drove his sculls through the water, turned the corner, and saw a boat floating, bottom upwards, in the mid-

dle of the stream. He pulled off his shoes and flannel coat, and stood up. Then he saw a woman struggling in the water trying to reach the boat, but hampered by petticoats and weeds. Of course he plunged, and of course he pulled her out without the least difficulty. Indeed, as he was careful to explain to his friend, the girl kept her presence of mind so well that it was quite unnecessary to hit her on the head, or seize her by the ears, or adopt any of the authorized means of saving drowning persons.

Thomas shuddered at the idea of seizing a young lady by the ears.

"And now to dine," cried Orlando.

"Who is she?" asked his friend.

"She is Jeanie. Her father is a Mr. Dorian, and his place is one of the nicest on the river. The bore is, that I must scull up there in the morning. I never should have got away from the paternal gratitude if I had not promised."

"And what shall I do?" asked Thomas, feeling painfully unimportant.

"Oh, I told them about you, and they said I might bring you."

"And you are a hero," thought Thomas, as he followed his friend's broad back to the shoulder of lamb. Then he thought of himself as the friend of the hero, and sighed once more over the good behavior of those ponies.

CHAPTER II.

"Here's flowers for you."

THE next morning, after an early swim and a great breakfast, the two friends turned their boat's head up stream, and set out for Raynham Farm.

Orlando, overflowing with delight in oar, and stream, and summer air, burst ever and anon into conventional expressions, uttered in a fine tone of mockery. "May I ask for a dance?" he shouted. "Where are we to sit? When do you ride?" and then with a great burst of laughter he hazarded the observation, "I think I know your brother."

Thomas, swinging steadily behind his friend's broad shoulders, could not keep his eyes from the bank, gracious with river-flowers — the iris standing tall, strong, and graceful in the stream, or crowned with gold among the meaner reeds; the forget-me-nots nestling by the dimpled water; the fair, white water-lilies withdrawn shyly into shadowed nooks; and loosestrife frequent in the more common crowd. The boat passed on by cows standing deep in the cool; by the swan-mother busy in a stately fashion among the rushes, while her mate sailed near, proud as a king, and ready ruffled for war; by grand clusters of trees, and creeks half hidden in the tangled thicket; by trim gardens and wild hanging woods. So the rowers moved from beauty on to beauty, with ears charmed by the gossip of birds, and soothed by the rushing of the far-off weir. So they bent to the oar, and were not aweary of rowing when they came to the smooth shelving lawn of the sweetest of riverside places. And on the lawn fair girls were moving gladly, and they tossed the ball from one to another. Now when they saw the two young men run their boat carefully by the old water-steps, and ship their oars, Letty and Jo, who were young girls, and still in the schoolroom, shrank back, and began to whisper together, and to glance, and Jo almost to giggle; but Jeanie, though she paused for a moment like a startled deer, and let the ball lie idle at her feet, came presently forward with her head up, and looking with open honest eyes. She came neither quickly nor slowly, giving the young men time to fasten their boat, before she met Orlando with a little sunburnt hand outstretched. "Please let me thank you again," she said, "and don't be angry."

The young man laughed somewhat sheepishly. "It was very hot," he said, "and I was glad of a plunge."

"But I might have drowned you."

"Not much fear," said he, in the pride of his strength; "and besides, you behaved so well, and kept your head. It was nothing; and I feel such a fool when I am thanked."

Now, while these two were talking, Thomas was thinking many thoughts, as his custom was, and had all sorts of feelings; for the girl whom his friend had saved in the afternoon was she who had driven the ponies in the morning. All in a moment he was preposterously glad and absurdly wretched. It was a great thing that wonders should happen in an age when miracles are announced by telegram; but how might they not shatter a sensitive and sentimental man!

When Jeanie looked at Thomas, she wondered why his face had so many expressions, and what they all meant. She thought that he was shy; and so when Orlando said, "This is Thomas, my friend," she smiled very kindly, and held out her hand. Then she explained to her guests that her father had been obliged to go to town, but would be back in the

afternoon; that they were to dine and sleep there; that they might remain in flannel; and, finally, that their rooms were ready.

Before the friends had time to expostulate they found themselves and their bags being conducted by a servant to the house.

"What a wonderful little manager!" said Orlando, in a voice which he believed to be low.

"What a perfect child!" said Thomas to himself.

When they came back to the lawn Miss Dorian was alone, having sent her younger sisters to the schoolroom. She played the hostess with strange simplicity, and showed them all the small beauties of the place without a doubt of their interest. Orlando was unusually gentle, and Thomas thought of Una and the lion as he watched the pair before him.

Nor was the young woman unmindful of the shy man. She made many little remarks to him, and sometimes turned to look at him with sympathetic curiosity in her eyes. She laughed at something which the big Orlando said, and betrayed by the sound of her laughter a delight in fun which thrilled the hearers. When Una laughed, the lion roared with laughter; and so laughing and talking they went to see the shrubberies, the copper-beech, the monkey-puzzler, the hollow tree with the peep-hole towards the river, the old kitchen garden half filled by intrusive flowers and sturdy lavender-bushes, the field with the new haystack, and the farmyard where the white pigeons sunned themselves on the dull red roof and the geese walked in procession, and the sweet-smelling stalls were ready for the heavy cows. Orlando talked of his admiration at every corner, but Thomas said little until they came to the stables.

"These are my ponies," said Miss Dorian with pride.

"I saw you driving them yesterday morning," said Thomas, briefly.

"Did you?" asked she, kindling with interest. "How strange! It must have been you I passed walking alone close to Darley Court. I remember wondering if my ponies would take fright."

"I wish they had," said he.

"You wish they had taken fright?" she asked, round-eyed with surprise.

"No, no. I beg your pardon. I meant something else."

He laughed uneasily as she still looked at him with frank curiosity. She thought him a mysterious young man.

When everything else had been duly admired, the attention of the guests was called to the merits of the house, so roomy yet so modest, so near the river and so free from damp, with its old brick weather-stained and laced, but not strangled, by ivy, and its deep veranda cool all day long. Indeed it is in all respects what a house by the river Thames should be.

At luncheon Miss Jeanie Dorian presided with perfect self-possession, now checking her youngest sister with a glance, which it was equally impossible to defy and to resent, now encouraging that meekest of governesses, Miss Tubb. It was clear that this lady regarded Miss Dorian, who was at least ten years younger than herself, with extraordinary deference. When she ventured on a remark, she seemed to plead for her approval, and she put to her a series of chance questions, which had evidently been rehearsed in private. She blushed a good deal at finding herself in the society of two strange gentlemen, and was driven into desperate conversation by the eyes of her two pupils. She was painfully conscious that a new chapter would be added to the false history of her life, on which Jo, most imaginative of biographers, was always engaged. For many years romantic incidents had been growing round her uneventful life, and Jo would have long since raised her to the rank of the most heroic heroine that had ever been, had she not been checked by the chastening criticism of the more prosaic Letty. This romantic chronicle was the great delight of the schoolroom, and, on the whole, a not unpleasant torture to the victim. Yet when Orlando suggested a glass of ale or Thomas handed the strawberries, Miss Tubb trembled to think what was passing in her pupil's mind; while Jo shook her curly head at the governess, and bnrst out laughing at the surprised expression of Thomas. This contemplative young man was still more surprised when Miss Jeanie, who had been indulging herself with trifling talk, began to question him with becoming gravity about the Oxford colleges. Was not this too fast, and that too slow? She must find one where exactly the right amount of encouragement was given to athletics. Could a man row and read? Could he read and hunt once a week? When Thomas had answered several questions of the kind, Orlando began to laugh and asked her if she were going to the university.

"No," she said, sedately, "but I have a brother at Eton between me and the girls."

"The girls!" muttered Orlando under

his breath — and presently asked her, almost diffidently, if she arranged everything.

"Yes," she answered, raising her eyebrows a little; "I am the eldest, and I have to do things."

Then she turned to the governess, and asked her if she and the girls would join them later on the lawn. Miss Tubb murmured her thanks, blushed under Jo's eye, and looked appealingly at Letty, who got her out of the room.

"She is quite invaluable," said Miss Jeanie, gravely, to the young men; and then a sudden flush came over her face, and her mouth was round as a child's as she said, "Oh, do you play lawn tennis?"

In a few minutes she was ready, clad in a suitable gown, and armed with her favorite racquet, and was quickly absorbed in a tremendous struggle with Orlando. She laughed when the genial young giant reached strokes which seemed impossible, and he laughed twice as loud admiring her skill and quickness, her parted lips, her eager looks, and all the beauty which seemed nothing to her. Thomas, watching the players, thought how much alike they were, and yet how different, and how very quickly they had become friends. For some reason he could not feel their gaiety, and his thoughts wandered off with sympathy to Miss Tubb, who had of course been disappointed in life, as anybody could see.

This was one of those rare summer days, which seem to have no end. Each is a life as happy as uneventful, and its chronicle must be tedious as the biography of a maiden aunt. Yet they are the great slumbrous flowers of the garden where memory loves to wander in idle hours, as the laden bee goes back, and cannot have enough of sweetness. This long day was scarcely old when Mr. Dorian came home. He found his family drinking tea in the veranda; and Miss Jeanie, who had run to meet him like a child, came leading him by the hand towards the young men. This father was evidently the kindest of men, for Letty proudly claimed his other hand, Zoe flung herself upon him, and Miss Tubb expanded in his presence. He had been all his life in business, and had made constant efforts to believe in the wickedness of the world, but to no purpose. There were tears in his eyes as he held out his hand to Orlando, and said, "I must thank you again for what you did yesterday. I don't know how to say — I don't know how to think of what might have been," and he put his arm round his eldest child as he spoke.

"Please don't speak of it," cried Orlando in a great hurry, "it was nothing: I could not have done less for a cat."

Hereupon Miss Dorian burst out laughing and caught Thomas's eye and stopped. She introduced him to her father, and looked at him curiously. She was puzzled and almost troubled by him, wondering what he thought about so much.

"A splendid place!" said Orlando that evening, as he breathed the night air in his friend's room.

"I never believed in maiden simplicity before," murmured Thomas, whose old enthusiasm for romance seemed rather stale to him.

"She is like an awfully nice, honest sort of boy," said Orlando, with the air of one inspired.

Thomas shuddered. There seemed to him a certain profanity in the remark.

CHAPTER III.

"Smooth runs the water where the brook is deep."

THE days went slowly by, and the two friends did not leave the farm by the river. They had not refused to send for their luggage, and, after all, the place was a good central point for lovers of the Thames. Thus it happened that a great change came over the family, who were converted with wonderful ease to Orlando's theory of life. Mr. Dorian took a holiday. He had read "Wilhelm Meister" when a boy, and there was a half-choked spring of romance beneath his ample waistcoat. He was now suddenly possessed by a conviction that wisdom was to be imbibed with air, and that health and happiness were incompatible with a shirt-collar. He began to row with tremendous energy, to lead his family to distant spots, and to wonder in the solitude of his own room why exercise made him stouter. In the schoolroom lessons were forgotten. Jo added a stupendous chapter, in which was related the tragic story of Miss Tubb's attachment to a bargeman, by whose side the Farnese Hercules was a puny whipster; and Miss Tubb herself, after many fears of possible improprieties, invested secretly in a little manual of training. The headlong zeal and superb example of Orlando inspired the community. Early rising, though cynically regarded by the servants, became a custom; and to greet the rising sun with a shout, assumed the character of a religious observance. To ride, to shoot, and to speak the truth, seemed once

more the whole duty of man, and the hardy Norseman found a home upon the gentlest of rivers. The courage of the men was matched by the endurance of the women, who made an exercise of hair-brushing, and scorned to shriek at the split point of a hairpin. Simplicity was the fashion, and practical Letty manipulated her bed with so much dexterity, that she could almost lie in it as she had made it. All things began to be viewed with the eye of the athlete. It was observed for the first time that the butler was beginning to stoop, and it was suggested that he should for the future carry the tray of coffee-cups on his head. Miss Tubb fell into feeble ecstasies over the wing-muscles of the birds, whom she had previously regarded with merely sentimental interest as feathered songsters of the grove; and the very sunlight, which had been little more than a caress, gained new interest as a tremendous species of force. Thomas alone was cold. He congratulated his friend somewhat dismally on his successful preaching of the brutal life.

"Brutal life!" cried Orlando; "I wonder that you can use such coarse expressions."

"Why, it was your own word," said the other staring.

"Say simple life, or Greek, Homeric, heroic," said the prophet, whose voice grew louder with each epithet. Thomas smiled as he recognized the refining influence of the despised sex. He was acquiring the habit of smiling sadly. He took part in the common occupations, but often moved away into solitude. Sometimes he was discontented among the eager crowd, and having left them, was more discontented still. He hovered on the borders, hearing a little and imagining much, half actor, half spectator, as comfortable as a hypochondriac jammed in a draughty doorway. One eye observes the sweet, treacherous moonlight without, the other a warm, wide sofa within, but the draught on the neck is undeniable. So was Thomas dissatisfied with the world and with himself, as he interpreted the words and actions around him according to his theory of the situation, his tale of the hero who saved the lovely woman from the water. So, too, it happened that when Miss Dorian, who preserved a becoming moderation even in this new life, came, as she often did, to ask his advice about some book or some subject for the pencil, he was infinitely touched by so much thoughtfulness and courtesy, and made great efforts not to damp her joy. At her request he read to her in his most dulcet tones, but stopped at the bottom of every page to make sure that she was not bored. He received her kindness with diffidence, and perplexed her by smiles which were at once pathetic and intelligent.

"I can't understand your friend," Miss Jeanie said one day to Orlando, who had been telling her anecdotes about him. "He seems to be always thanking me and forgiving me at the same time, and both for nothing." Orlando laughed, and declared Thomas to be a preposterous but delightful person, deeply tainted by mediævalism and incapable of classical simplicity; and so, shouting a sonorous line of Homer, he betook himself to his hollow boat.

"You think us very foolish," said Miss Jeanie to Mr. Thomas, with a little nod of decision, as he drew near with a book under his arm.

"No, indeed I don't," he answered, eagerly. "I envy you, and — and I think you wonderful. You keep the whole thing straight, and yet you don't offend the enthusiasts."

"It is fun, if it is silly."

"But it is not silly. I know you think me a prig, and I daresay I am. Orlando is a much finer fellow, I envy him, and ——"

Here he broke off, and thought within himself how he had envied his friend the chance of a fine deed and the favor of a fair lady. He thought that he would give much for the opportunity of risking his life. As they talked, they had strolled towards the farmyard, and the young man's gloomy thoughts were interrupted by a cry of the maiden. Was it possible that his chance had come? He looked quickly at her face, followed the direction of her eyes, and saw the turkey-cock. He could not be mistaken: it certainly was not a bull. Yet, bird as he was, he knew the one weak point in Miss Dorian's character. He stood terrific, in ruffled plumes as the fretful porcupine, scratching the dust with stiffened wings, blushing ever more fiercely red about his chaotic countenance, and sounding notes of war, such as are heard when some apoplectic gentleman gulps thick soup at a railway station, and the bell clangs, and the light porters are hustled together.

"Don't turn," cried Jeanie; "he will fly at our backs; oh, pray go first."

Thomas stepped forward, but there was bitterness in his soul. He had no stick; so he pushed his foot somewhat clumsily at his opponent, and said, "Get out!" The bird gave way a few inches, threatening war, Jeanie slipped quickly by, and the

young man followed her. He could not run, but he was conscious that the fowl was close at his heels; he was therefore obliged to proceed in a crab-like manner, now and then pushing his foot out sideways at the pursuer, and well aware that the action was far from graceful. In this way he drew near to the farmyard gate, and was aware of Jo shaking on the top bar, and stifling her laughter at the risk of her life. Had that turkey been a bull, Thomas had rent him with his bare hands. However, he was only a turkey.

Miss Jeanie, when on the safe side of the gate, was ashamed of her fears, and inclined to be angry with Jo for laughing at her defender. Indeed so vexed was she, that she straightway remembered that music was too important a thing to be neglected, and marched off her youngest sister to the piano.

Thomas, as he lay under a tree and stared at his book, was soon marching to marches which quickened unexpectedly, waltzing to tunes which whirled him in all sorts of circles, and polking to others which, breaking off suddenly, left him with one leg in the air. He had a sensitive ear, which rebelled against Jo's playing, and he wondered at the virtue which kept Miss Dorian near the instrument. At last the music came to an end, and the musician leapt through the window like an india-rubber ball, and vanished in the shrubbery. Thomas turned to look at the house, but her sister did not follow her. Then he fixed his eye sternly on his book, and made up his mind to become absorbed in constitutional history. After some time he found himself repeating with a frown the word "Witanagemot," and wondering whether his hostess looked better by daylight or candle-light. Another half-hour had gone, when he awoke to the fact that he had not turned a page. A minute insect was busily surveying the word "Witanagemot," which still stared the reader in the face; but the reader's thoughts had wandered thence to the House of Lords, thence to the Eastern question, thence by an easy transition to the farmyard. If but for one short hour that bird had been a bull!

When Thomas had closed his book in despair, he saw that the sun was already low in the sky. From the new order of things dinner had disappeared, and supper, a charming institution in the country in summer, had taken its place. It was growing late. The young man was turning towards the house when he felt a light fluttering touch on his arm, and looking down beheld Miss Tubb, terrified by her own audacity.

"Pray excuse me," she gasped, glancing nervously round in her great fear of her youngest charge. "I daresay I am very foolish ——"

"Can I do anything for you?"

"Oh, I daresay it is nothing — only my fears;" and Miss Tubb showed wavering signs of drifting away.

"What is it?" asked Thomas.

"Oh, only Miss Dorian."

"What?" cried the young man, so sharply that the governess gave a convulsive leap, and remained quivering as though she would melt into air. He put out his hand to support and detain her.

"Only your friend Orlando — I mean Mr. ——"

"Orlando!" cried he, and again the governess jumped.

"He came," she went on trembling and in a great hurry — "he came, and I was sitting behind the copper-beech, and said something about it's being all ready, and having brought the boat to the steps, and ——"

"But why did you say that?"

"I didn't say anything. I couldn't think what to say till afterwards. I did say 'Ahem!' but they didn't hear me."

"They! Who?"

"Why, Mr. Orlando and Jeanie — Miss Dorian," said Miss Tubb, mildly exasperated.

"Orlando and Miss Dorian!" repeated Thomas, with a sensation of sinking.

"Yes. He said that the boat was ready; and she asked if something was safe; and he only laughed, and then she said that she was not afraid with him."

"She was not afraid with him!" echoed Thomas again.

"Yes; and I think they are just going. And it is so late for the water; and I am so frightened: though of course it is nothing; and I hope you will excuse me."

Thomas made no answer. An awful suspicion was taking shape in his mind. Was this to be the end of the romance? What might not his wild friend attempt? Was he playing the barbaric Norseman or the Homeric hero? Would he snatch a maiden from the hearth? And she had said that she was not afraid with him. With himself she had trembled before a turkey-cock.

Trifles light as air came thick upon him, as he assured Miss Tubb that it was nothing; and his heart beat quick as he darted to the landing-place. He was too late, and he saw them travelling down the

stream. He shouted, and Orlando, as he answered, seemed to quicken his stroke. He looked for the Dorians' gig, but it was not in its place. He was sure that he had divined the truth. It was the necessary end of the story. He trusted his fancy as an inspiration. As he stared down the river, Mr. Dorian came gliding in his boat from above. "Come in," cried the elderly athlete, cheerily; "take the other sculls and get an appetite for supper."

"All right; quick; down stream!" cried Thomas, as he stepped in. With a great effort he kept his awful suspicion to himself. He would spare this new Lord Ullin as long as possible. "Orlando is just ahead," he said; "let us try to catch him — just for fun, you know."

"You are hurrying the stroke," said Mr. Dorian, who prided himself on his Oxford swing. The younger oarsman was sculling his strongest with his head over his left shoulder.

"Quicker!" he cried, "or we shall be shut out of locks."

"Steady," said Mr. Dorian, making gallant efforts as became his character of athlete, and growing hot with the ardor of the race. They were flying along, when Thomas gave a sudden cry and stopped in amazement.

"What is it?" gasped the veteran, as his sculls rattled against his friend's.

"They are going down the weir stream." Mr. Dorian felt a glow. Wealth was a little thing; the responsibility of the father of a family was naught: all his youth rose from the depths of his being, and flashed from his lips in the words, "If he shoots the weir we will, too. Come on."

Thomas replied by a stroke, and the boat leapt forward. He saw that it was their only chance of hindering this folly. The runaway match must be stopped, even if it spoiled the story. On flew the boat, and crossing the end of the lock-cut, swept through the gathering shadows towards the rapids. They had gained on the fugitives, and Thomas, looking round, could see Miss Jeanie sitting upright and guiding the boat steadily to the open part of the weir. In an instant it flashed from his sight. "Sit firm," said he, in a low voice. As he spoke, he felt an unexpected current catch the boat and sweep it towards the stakes. He rowed fiercely with his right hand, and wrenched the bows round to the open space. They were clear of the woodwork, but the rushing stream hurled them on before their craft was straight. She seemed to pause on the brink, then jumped like a horse; and Thomas felt a cold wave on his back, as she righted herself with a convulsive effort below. Clear above the rush of the rapids rang the inextinguishable laughter of Orlando. Thomas was dumb with amazement. Close beside him was the classic robber resting harmless on his sculls, and the hapless maiden was radiant with excitement.

"Oh, papa," she said, "how could you be so rash?"

"Dear me! what are you doing here?" asked her father, surprised.

"But why did you stop? I mean, what did you do it for?" asked Thomas.

"For fun," said Orlando; "we have been discussing it for the last week."

Thomas said no more. He was silent while they went through locks, and even when the veteran spoke of supper. He sculled mechanically, and wondered why his life was a tissue of delusive excitements, and why, if the world of romance was a fool's paradise, it was always his lot to be the fool.

"Wrong, as usual," he muttered, as he tied up the boat, and as his eye caught the flutter of a gown he added, "Thank heaven." It was clear that the tale must find some other end.

CHAPTER IV.

"For 'tis a question left us yet to prove,
Whether love lead fortune, or else fortune love."

THE impressionable Thomas did not sleep well after the shooting of the weir. He was abroad early, saw the mist rise slowly from the river, and felt the chill air of dawn. As he walked briskly towards the house, Orlando stepped through a window with a great towel flung across his shoulder, seized him and carried him off for a dip.

"Look here," said the young hero, as they went towards the bath-house; "I must go away to-day."

"Go away?" echoed Thomas, blankly.

"You can stay, of course," said the other, laughing.

"But why do you go?"

"The complicated nineteenth century has intruded on me. My mother has sent for me."

"And you don't much mind going?" asked Thomas, with hesitation.

"Why should I mind?" asked his friend, with a curious emphasis, as he pulled off his flannel shirt. Thomas sat meditating, with his mouth open and a boot in his hand. Orlando laughed aloud, drew himself up, stretched his shapely arms above

his head, leaped like a deer, and flashed like Leander into the cool stream. After a few minutes he was back again, brilliant, glowing, and joyous, shaking the drops from his close-cropped curls. Thomas was sorely puzzled. Certainly this strayed athlete belonged to a time when romance was not. This creature, shouting, singing and laughing in the fresh sunlight, was no lover just summoned from the side of his mistress. And yet, how pull a girl out of the water and not love her? He began to feel very sorry for Miss Jeanie, across whose quiet life this young viking had gleamed with his blue eyes and his careless heart. "Poor child," he murmured to himself again and again, surprised at the tenderness of his own pity. He could sympathize with her: there was a melancholy pleasure in the thought. At breakfast he was very uncomfortable. When his friend announced his approaching departure, he dared not raise his eyes, and yet he seemed to see the trouble in a sweet young face. As he was staring at his plate and feeling very hot, he heard her speaking in her usual tone and saying how sorry she was. He was lost in wonder at her modesty and self-control. He could not help looking at her, and he hoped that his glance expressed sympathy without giving offence; but she only thought that he wanted his tea.

"Must you go, too?" she asked, as she handed his cup.

"No. Yes. I mean I think I had better go with Orlando."

"We shall be sorry to lose you both at once," said Mr. Dorian, looking curiously at the young man.

"I am afraid I should not be much good alone. I mean I shall be better away," and he gave an appealing look to Miss Jeanie. But that lady was inspecting the bottom of her cup with great earnestness. It was no part of her duty as hostess to press young men to stay. So breakfast passed with less than the usual gaiety, and Orlando, having exhorted Mr. Dorian to try a pair of clubs, and advised Miss Tubb and her pupils to devote their whole minds to their shoulders, entered his boat. Miss Dorian was standing on the highest of the old steps with her crisp gown gathered carefully about her. "Thank you a thousand times," he said, as he pushed off, "for the most splendid fun." As he swung out into the stream, Thomas came running from the house. "Hi!" cried he; "I am going with you."

"No you are not," said Orlando, unable to row for laughter. Thomas was seriously annoyed. He was unable to see the humor of this schoolboy trick. It was embarrassing to be left when the hero had gone out of the story. The romance was to end, as some romances do, with a woman's sorrow and patience; and there was clearly no place for him. He humbly asked pardon of Miss Dorian, and promised to go away by train. He went gloomily into the house and sat down to Bradshaw; but as he found himself, after half an hour's study, earnestly endeavoring to reach the Isle of Man, he abandoned the book and turned to packing. Having packed till he felt silly, he left the task to the footman, and went out to have a last look at the place. There was nobody about. Mr. Dorian had gone to town for the day. Miss Tubb was doing the elegant English hour with the Misses Letitia and Josephine. Play-time was over, and all the vitality of the place seemed to have gone with that frank young creature, who was far down the stream poised on extended sculls, and laughing to himself.

Thomas went round the lawn and through the shrubberies, visited the stable, where he cast an unfavorable glance at the ponies — and the farm, where he chucked a stone at the turkey-cock. Thence he sauntered into the country lane, and, strolling aimlessly onward, entered the path which leads up to the easy-sloping downs. The path passes through a wood of beech-trees, which for the most part meet above it. On the left these trees are a mere belt, and Thomas stopped again and again to look with wonder on visions of sweet country framed in leaves. In some places the land sloped gently downward from the wood, and was heavy with upright wheat or barley glancing in the sun like a polished silver floor; in others it fell sharply away, and the gazer saw the country below like another world in which were no unquiet thoughts and longings. Sunlight lay broad and deep on all the land, and far away the blue-grey earth and grey-blue sky melted together as thought and dream. Thomas sighed as he saw below him the smoke rising straight from the hidden house. He was in a very sensitive mood, and some deep feeling of sympathy was stirred within him as he watched the brown path quiver with light and shade. He saw the sunlight tangled in the beech-leaves, and started as a long shaft slipped through and touched his upturned face. He was alone, and yet about him was a presence and a power. He passed the old gate, which hung idle on its rusty hinges, and came out upon the

open slope. A few yards from him Miss Dorian was seated, and, as she turned with a slight start, he saw a tear upon her cheek.

"I did not know you were here. I am afraid I startled you."

"Oh no; but I am so sorry that all the fun is over."

They both spoke very quick, as if eager to avoid all misunderstanding. An awkward pause followed, and then Thomas made a stupendous effort to say something pleasant.

"I wish I was Orlando," he said, "he is so free, and can come here whenever he likes — at least, I mean whenever you like."

There was another interval of silence, and then she asked, rather coldly, "Are you so very busy?"

"I? Oh, well, I am rather. At least — but it doesn't matter. What a lovely view!"

"It is thought the best view of the house."

The young man looked for a few minutes, and after doubting whether he should say it, and deciding that of course he must not, observed forthwith, in a spirit of bravado, "I almost wish I had never seen it."

He turned cold at the sound of his own words, but she did not demand an explanation. She only said, "Thank you," with a strange little smile.

"I should like to say good-bye here," he said, "and go away." She turned her head and looked across the country. "Good-bye," he said as he passed behind her, and having said it he saw her eyes. He shivered from head to foot, and turned cold. Clearly he was the victim of some horrible mockery. He walked towards the gate with an instinctive desire of flight. Then he wavered and turned back.

"Miss Dorian," he began, speaking very quickly, "it can't be — I can't think — you can't be sorry because I — no, no. You must forgive me for being such a puppy." She had risen and wanted to speak, but could only twist her glove. "Good-bye," he said again with a sort of sob, "and forget what a fool I have been." She could not speak, but she made a little movement as if to hold out the twisted glove. He seized both hand and glove. "Miss Dorian — Jeanie," he cried, and here his voice failed him.

An hour passed, and they were sitting on the hillside, and wondering at the beauty of the world.

"Jeanie," said he, "it will be an awful shock to your father."

"Not very great, I think," said she. "I almost think he suspected something."

"But I did not suspect myself. He does not know anything about me."

"Oh yes, he does. Your friend talked of nothing but you."

"Did he talk of me?" asked he; and then added suddenly, "you don't mean to say that Orlando knew?"

"I can't say, but I think he guessed —"

"That I loved you. Oh, Jeanie, I believe that everybody knew except me. But what on earth made you like me?"

"I don't know," she said, and smiled.

"But it ought to have ended differently," he maintained in an argumentative manner.

"What ought to have ended differently?"

"The story. You ought to care for the hero, and not for his friend."

His words were words of complaint, but as he looked across the peaceful land there was great contentment in his heart.

From All The Year Round.

A STRAW-PLAIT MARKET.

At Hitchin, on every Tuesday throughout the year, and at the early hour of nine in the morning, there is held a straw-plait market. To it come ruddy women, bronzed and buxom, and keen-tongued women, and haggard women, and timid little girls, and sturdy old gossips and goodies; and they are to be seen trudging into Hitchin, past acres and acres of lovely lavender, delicious in rich color and rich fragrance; along clean-clipped lanes bordered with ground-ivy, under old, old box trees, the height of limes, the girth of cedars, as forked and as green-crusted; and they can be followed, carrying their links of plait upon their arms, as they pass close by the low-browed shops and the overhanging hostelries, and as they merge into the market-place and take up their stand. They chatter resolutely whilst they wend their way, do these Herts women. Their homes are the warm-hued villages scattered round about, such as Baldock, Fisher's Green, Todd's Green, Red-cut Green, Hipplitz, Pollitz (if the spelling is too Saxon, it must be forgiven; it is local and colloquial), Much Wymondley, Little Wymondley, William Score's Mill, Alsey, Nine Springs, Tibb's Bush, Water Dell; and as real life is lived in these warm-hued villages — where cowslips are still called cowpaigles, a lunch is a beaver, a

harvest-home is a lager-day — it follows that there is much news to be heard and told on those weekly market-meetings. There is no cessation of the chatter either, but only some abatement of its tone, when business is commencing and the market-place is reached.

It is the upper side of the largish square, which is the market-place of Hitchen, that is subject to the gradual but sure invasion of the sunburnt and voluble straw-plaiters. They occupy it — a few at first, but more as the minutes go on — till there are some hundreds of them in a loud cluster; and till they fashion themselves, roughly, but with pretty clear intent, into three or four close double rows. Laden is each woman; and each woman in precisely the same manner. Their left arms are thrust through their coils, or links, of plait, if they have only as much as one arm will hold; both arms are thrust through, if they have more; and their plait hangs all round in front of them, like a capacious and very unwieldy muff. There are several sorts of plait. One sort is known as Devon, otherwise double; which means plaited with as many as fourteen straws. One sort is single; plaited, in the most usual way, in seven. Another is whole; plaited (in seven) with unsplit straws, kept in their native round. Another sort, again, is twisted edge; with the distinction the name implies. But no matter what may be the value or variety, all are carried in bunches of ten yards long; all have a little tab, or end, of colored print, tied on the string that binds up the whole, so that each plaiter may be able, after sale, to speak positively to her own. By the score is the plait sold, being two of the pieces ten yards long; the whole of the stock, of one sort, that each woman has, is implied in the purchase, division never being worth while; and the buyers (who are men from Luton, Dunstable, and elsewhere, where the plait is sewn up into hats and bonnets) walk between the close rows of women, looking for the sort of plait that suits their needs, and ascertaining the price at which it will be sold, with a large amount of skirmishing and raillery.

"Rough stuff, this!" was the cry of one of the men, contemptuously, the morning these matters were observed. "Rough as it can be! Whatever d'ye want for this rough lot?"

"Ten."

Monosyllabic, it will be seen; curt, peremptory. The woman addressed knew she was asking, according to rule, about a third more than she meant to take; knew she would have, in her own phraseology, to "sink." But she was firm, as she flung out her price; she was utterly unconciliatory.

The man was aware. "Give ye six," was his cunning proposition.

"That ye sha'ant!" was the vixenish rejoinder; with the plait tossed down sneeringly, with defiance among the neighboring women, and the bargain at an end.

"Give ye six and a half for this," said another buyer to another plaiter, as he scrutinized her wares.

"No."

"Ye'll get no more. Better let me give it."

The woman blazed. "Why, that other man bid me seven!" she cried. "And I'll get ten and a half, or nothing! And I'll take good care I don't plaat no more whole plaats for anybody! They cost me ten for the straaws!"

That was a horrible — misrepresentation. "Straaws" were selling at an adjacent part of the market a little lower down, at twopence and threepence a bundle (bundles being those miniature sheaves seen in shop windows, the thickness two hands can span, and nine or ten inches high); and a bundle, it is well known to every plaiter, can always make two score yards of plait, or three, if it turn out at the best, and is used judiciously. However, "plaat"-bidding seeming like love and war, with all things fair in the pursuance of it, the woman's statement passed unchallenged. "Ye see," said another plaiter in explanation, "if the trade's brisk, ye have what ye ask;" and, as it was too early then, it may be supposed, to decide the trade was not brisk, the ask was high.

"What d'ye want?" cried a dealer a few steps away. "Ye've got some fine rubbish here, I feel bound to tell ye!"

It was all to depreciate the value; but the woman was equal to the occasion. "Ye call it rubbish, do ye?" she shrieked. "'Tain't ought to be, then! and I sha'ant sell it for rubbish price!"

"What'll ye take for it? Four?"

"Four? No! If I sell it for four next week, I won't sell it for less than six this!"

There was subtlety in the answer. It meant that the woman would take the plait home, without selling any of it at all; even if her punishment should be that she should have to bring it to market again, to get no more than the same money. A sister plaiter also, near by, used the same dire threat, put into plainer terms.

"Ye sha'ant have it for eight," she cried, to the particular dealer cheapening her. "No, not if I take it home again!"

"Tell ye what I'll give ye for this — nine and a half," was another method between another couple; with a tart "No! That you won't!" of refusal from the seller, and a high look over the house-tops in resolution.

Then there was the astute buyer, who suggested: "Got any of these to give away like?" And there was the insinuating one, who said: "Come! Shall I have these two at seven to begin with?" And there was the buyer who was jocose, and who cried: "Ye want so much coaxing, Nan! Come, say yes! And I'll give ye a little drop of beer as well!" He being the same who said to another plaiter, a little farther on: "Ye won't take no notice of what I say, Bet, a bit! Listen, and let me mark it down!" and there were the buyers, too, who were not diplomatists, but went to their work direct, crying: "Why, this is all spotted!" and "Here's awful stuff!" and "See! 'Tain't worth nothing this, except for dyeing!" and "If I give ye another farden, I'll eat my hat!"

"What!" cried a buyer, of some solidity and circumference, to a delightfully neat old plaiter, mushroom-hatted, as solid as he. "Thirteen! Plaat must be well for ye to hope to get thirteen for this!"

Plaat was well, apparently. At any rate, the old lady had no budging. She was bland and placid; with her "thirteen" placidly repeated.

"Give ye twelve," her antagonist suggested.

"No, ye sha'ant!" This sudden snap of an answer was a surprise to us, the old soul not looking capable of such quick determination.

It was a surprise, too, to the buyer, and completely overcame him. He scribbled a figure down on a small slip of paper without another instant of hesitation; he popped it into the old plaiter's disengaged hand; he silently passed down the row. She, meanwhile, glanced at the paper — silently also. Then, her placidity returning, she gave the man a short nod of approval, and tucked the paper into her pocket — her sale accomplished.

Now, this slip-of-paper arrangement requires an explanation. All business was effected by means of it; every buyer carried a packet of the little pieces in his hand, and, when a woman had accepted a slip of paper with a figure written upon it, it was at once a sign that she had agreed to sell, and a guarantee of the price at which she would be paid. It would be too cumbersome — it can be readily understood — for a buyer to carry away his purchases; it would be too lengthy and too intricate for him to stop to pay for them; so the women kept their plait — still in its heavy bunches — and they all delivered it at appointed inns when the market had closed. There were a few exceptions to this at Hitchin. Two or three of the buyers were provided with an underling, to whom they carried the plait as they bought it, and who huddled it into huge white calico bags the size of sheets; but payment in these cases was to be on presentation of the slips of paper, exactly the same as in all the others. Indeed, all through all the sharp bidding and accepting, there was but one dealer who "settled" upon the spot. He was a young man, grave and anxious, to whom reckoning was new, at any rate, if not the paying for it; for when he had agreed to give "nine and a half," and he found the plaiter's bunch contained eight score, he was perfectly ignorant of how much it came to.

"Eight score at nine and a half," he said, with the plaiter as puzzled as he; so his only resource was a "Ready Reckoner," the leaves of which he rapidly turned, and with whose dictum he was content to be content. "I'll give you five and nine," he cried, in a spirit of commercial amendment, no matter how deficient he might be of arithmetic; and when the woman was willing, and had handed him her plait, he pulled out his tan-dyed linen bag-purse, untied the strings of it, and gave over the amount.

But, "Angel; in good time," was the regular sort of appointment — was, in fact, said by one quiet buyer, as he handed a plaiter one of his slips of paper, and she took it with thorough comprehension.

"Swan; you know where," was the equally laconic speech of another.

Then there came, "Master Hawkes!" cried by a woman, anxious to get to the Angel, or the Swan, or somewhere; "give me your ticket for this bit of coarse. Come!"

It made Master Hawkes unlink the "bit of coarse" off the woman's arm, and look at it critically — not in the sun-glare, where it would all seem glossy and white enough, but in the shade he made by his own bent body, where "spots" or brown streaks in the straw could at once be recognized.

"Well," he said, as the result of his investigation, "I'll give you a ticket if ye like."

"What for?" demanded the woman, shrewdly.

"Eight and three-quarters."

"Eight and three-quarters!"

The tone of this repetition gave promise of a brisk battle to come, had not a sudden interruption put a stop to all further haggling and dealing. Right down upon the whole, across the market-place swiftly, there had swept a cloud; the cloud had grown darker instantaneously — was dropping heavily down the next instant upon those who bid, and those who took, and those who turned away, before they could scarcely be certain they had felt the first spot. The effect was striking. Where there had been a crowd of rustic plaiters, alert of speech, there was now — nothing; and the narrow streets that fed the marker-place were being choked with woman after woman, as each one fled for shelter, guarding her plait-links, as best she could, from the ruinous wet. Market was over, irrecoverably. Besides, there was the other work to do of paying, under a roof-top always; and surely the elements themselves had given the time of it, and it would be folly to be disputing. Wisdom would be in going whither the women were going, when the play would be brought to an end.

It was simply to the "Sun," or the "Swan," or the "Star;" where one of these erected its cross-beamed front above the footway, and had a wide, straight gap in it to let the wayfarers into its rough-stoned yard. Passing in, this "Sun," or "Swan," or "Star," gave glimpses of glass, and pewter, and bright snugness, as doors were knowingly placed ajar; allowed folks to find themselves amongst carts and horses, pig-troughs, pumps, and clucking hens; with the way well indicated, by a passing line of plaiters, where, farther, it was necessary to go. A little room was the goal, away from all sign and symbol of the inn-traffic generally — a room, roughness itself, with sacking in one corner, with some unused tressels at the side; but, for the rest, the buyer's own, and given over to him, temporarily, for a counting-house. And there the buyer stood — himself on one side of the tressel-counter, a crowd of women on the other — with his cash-box open, ready to begin.

"Ticket?" was his demand constantly, and, "How much money?" for he made the plaiters do their own multiplication. None were very sharp at it, and there always seemed a tangle in the talk when it came to calculating. The buyer knew it. Experience had taught him to be very definite about the change he wanted out of his sovereigns and half-sovereigns; and to put it so that there could be no error.

"It's five and eleven," he would insist, for instance, "and I want four and a penny. Four and a penny is what I want; have you got it?"

Perhaps the women had, when the gold would be given; perhaps the women hadn't, when they would be sent out, to be provided with it somehow, and were not to have the more valuable coin till they had come back.

The buyer was given to self-criticism too when the women handed his purchases in, and when he saw them by the light of the fact that he was going to pay.

"Did I give you seven for this rough piece?" he cried; and, "Ye don't call this clear, do you? Why, ye've run all the spots in!" And, again, "If there comes a wet week, we shall lose money by all of these!" And, "I gave a good price for that piece, and a very good one! That I will say!"

In reply to all of which the women did battle, just as they had done before.

"Yer price is baad," they declared. "Sha'ant see my money again for my straaws." "It's all one ghell's work, and as good as good." "Sha'ant do no more round work for any one." "I ain't a-going to sit and work haard, me and my ghells too, for nothing." "I can staand and lose one week, thank God; I ain't so baadly off as that." "Sha'ant sink threepence to please anybody: it's worth sixteen or it's worth nothing, and I won't let it go for thirteen." And, "That 'un! I couldn't plaait that 'un if it were ever so! Though this woman says she'd sooner plaait 'em than split 'em, and they may make it up as it is."

Poor women, it is no wonder they hung fire at elevenpence instead of a shilling, and rattled out voluble remonstrances at the suggestion of sixpences and sevenpences! To plait a score of yards of (medium) plait, four hours would be consumed; a woman could only plait forty yards a day, about twelve score of yards a week. If, then, she had sevenpence a score, and had given a penny for her "straaws," yielding her a profit of sixpence, at the week's end, with every hour used up for working, she would only have earned half-a-dozen shillings.

Do not let it be supposed, either, that plaiting is the only operation of plaiting; and that when nimble fingers have done twenty yards of pretty interlacing and interweaving, the twenty yards of plait are done. There are nine operations to add

to it; not one of which can be omitted. These nine are, to sort, to cut off dead ends, to split, to mill, to wet, to clip, to mill again, to bunch, and to steam. Without entering into a minute description of any, it will be well, shortly, to give an account of each; and to begin with the first, the sorting. This is to pick out the straws that have any discoloring on them, and to lay them aside for inferior plait. If brown marks are overlooked, then the brown marks are "run in," the plait will not do for the best work, and the price goes down. Cutting off dead ends is to get rid of the dull and unsightly patches that are on all the straws, if they have been taken from too near the root. To split, is to run a little machine through each straw, which narrows it into four, five, six, seven, or eight, available strips, according to how many little pins, or slitters, the machine has. These machines are little wooden tubes, about the size of a cedar pencil, with steel slitters at one end; they are sold in Hitchin market for twopence and threepiece apiece. To mill, is to pass these split straws (or the whole ones, for the coarse plait) through heavy weights to take out their stiffness. To wet, is to dip the straws into water, to make them work more easily. Indeed, some plaiters wet their straws constantly in the mouth, and others keep a crock of water by them for frequent dipping; but it is disagreeable to have too much splash and damp, therefore the regulation wetting usually suffices. To clip, is to cut off all the straw-ends sticking out after plaiting, that come from where an old straw is plaited out and a new straw "set in." To mill the second time, is the same as at first, except that, as it is absolutely the same operation as ironing or pressing, where plait has been plaited with a twisted edge, the milling must only be up to this edge, not upon it, or the characteristic would be flattened out of all use and prettiness. To bunch, is to pass the plait from elbow to wrist, from elbow to wrist, over, like on a card; to cut it at ten links; and to tie it to keep so, for sale. To steam, is to put these completed links under the action of brimstone, to reduce their color; and it is done by laying the straw-links at one end of a box, and a saucer-shaped piece of red-hot iron at the other, upon which is dropped some lumps of sulphur that hiss up into a boil speedily. A lid, or cloth, is popped over the box the instant the brimstone has been dropped in, and it is allowed to remain closed for a full hour; the operation generally taking place in the garden or the yard, and at night, when it is too dark for nattier and more delicate labor.

As it is necessary now to put in a few notes about plaiting proper, it shall be said that men plait occasionally; women make a staple occupation of it; boys and girls, both, learn how to do it. The first lesson in plaiting is called (locally) "twittle twattle," being to plait loosely in three, and designed only to bring acquaintance with the mere handling of straws; the second lesson is "hen's ladder," done with three straws, one of which is twisted round two; the third lesson is the perfect plaiting in seven, executed very slowly, of course, and so roughly that it is a long while before the plait is of any use. Plaiting-schools were in existence before board-schools drove them off the field. The fees for these were three halfpence and twopence a week; the object of them was that the little scholars should be kept at work by supervision, whereas at home they would have cheated their mothers (employed at domestic work) and have slipped away. A school would sometimes consist of sixty or seventy workers; and to make these work at their fastest, the mistress would set them to race or "strive." "Let's strive up Chalk-hill," she would cry; the top of Chalk-hill being attained by the first child who had finished a hundred "sets and runs;" a "set" being the working-in of seven new straws, a "run" the plaiting them as far as they will go. At the commencement of the "strive," each scholar had to nip off four straw-ends to mark where she began, or to "show fair;" and to beguile the time, each "set and run" was called a mile, with some woful danger successfully avoided as every mile was passed. To the winner (the first plaiter in) there was the imaginary gift of an imaginary horse and cart, in which she could be driven back the imaginary one hundred miles if she were graciously inclined; all plaiters who had passed the seventy miles had no dangers to fear forever more; those too inert and slothful to have come up to this, were laggards, to be eaten up by lions.

> Over one and under two,
> Pull it tight and that'll do,

was the ditty that gave further enlivenment to this imaginary journey, repeated ever and anon, as the fingers plied; and if everything had been of this pleasant sort, it would have been well. But the plaiting-mistress would impose upon a child the task of five "sets and runs," or ten or fifteen, to be finished by a certain

time; if the task were not finished, the child would get a "sting" from a "bat" (a sort of wooden battledore), or some strokes from a cane, or would be set up on a high stool to plait there, till the eyes grew dizzy, till the head swam, and there would be a sharp fall off; so it is good that plaiting-schools are no more, and it would be good if every evil from plaiting would disappear as thoroughly. This, though, cannot be. Coarse straws will always, more or less, take the skin off the plaiter's fingers as she plaits; dishonesty will always make necessary the "measuring-man," to pick out a "link" here and there at market-time, to measure it, and to burn it publicly in the market-place if it is deficient, hoist up on a high pole.

Perhaps, henceforth, if a plaiter should be met along the roads round about Hitchin, plaiting as she goes with her plait-ends away from her (not to her, as might be supposed), a few of these facts may be thought of pleasantly.

From The Athenæum.

SIXTY-NINE YEARS AT THE COURT OF PRUSSIA.*

THERE could scarcely be a more trivial book than this, and it may be doubted whether even the exceptional position of the Countess Voss in the very midst of a society of historical importance gives any real value to her meagre jottings. But the faint titillation of pleasure which a reader experiences when a well-known historical character is introduced to him in the dress of everyday life is felt oftener in reading this book than in reading almost any book of the kind; and there is something so surprising in the length of time over which this insignificant diary extends, that the book becomes noticeable; almost every one will take it up with curiosity, even though the liveliest curiosity will soon be satiated by it, and therefore it is not surprising that it should have been very promptly translated.

To give a notion of the lapse of time which the book covers, it may be mentioned that the countess's father was wounded at Malplaquet, and that the countess herself outlived by a year the battle of Leipzig, though the interval between those battles is one hundred and four years. But the countess's own experience of some sort of public life was also immensely long. It is described in the title as covering sixty-nine years; but the countess could remember Mr. Carlyle's bear, Frederic William the First, who died in 1740, — that is, seventy-four years before her own life ended. The first incident in her public life is recorded in the Margravine of Baireuth's memoirs as follows: —

> The young Pannewitz was as beautiful as an angel, but as resolute as she was fascinating; and when once the king met her on a staircase that led to the queen's apartments, where she could not avoid him, and ventured to try to kiss her, she defended herself against him with such a hearty box of the ears that those who stood at the bottom of the stairs could have no doubt of her good success.

After this *début*, the lady went through the whole of the long reign of Frederic the Great, survived his successor, Frederic William the Second, lived through the early and deceptively prosperous days of Frederic William the Third, witnessed the downfall of Jena and the peace of Tilsit, saw Prussia sink lower still, closed the eyes of Queen Louise, saw the Russian expedition pass through the country, taking possession of it in a way that showed that the fate of Prussia was involved in that of Russia, saw the tide turn, saw the *levée en masse* of Prussia and the creation of the *Landwehr*, received the news of Dennewitz, Katsbach, Leipzig, Craonne; and when she left the world, could feel that the second great trial of Prussia was over, her second great enemy — more formidable than Maria Theresa — crushed, and a new period of prosperity commenced. She saw, in fact, the whole rise of Prussia to the position of a great power, and during most of the time she was in the closest intercourse with the men who could have best explained to her all that was going on. Had she chosen to observe attentively all that passed before her, to reflect upon it, and write a careful history, her book might have been as interesting as Saint Simon's.

But the countess is the antipodes of Saint Simon. She observes nothing, and narrates nothing. If we were to call her reflections commonplace, we should convey too favorable an impression of them. Properly speaking, she makes no reflections, for we cannot call the mere exclamations, whether of joy or sorrow, with which she accompanies her items of news by so dignified a name. In like manner, she tells us nothing of the characters that are

* *Sixty-Nine Years at the Court of Prussia.* From the Recollections of Sophie Marie, Countess von Voss. Translated by Emily and Agnes Stephenson. 2 vols. Bentley & Son.

thrown in her way: we learn sometimes that they are agreeable or otherwise, but rarely anything further. Not that there is any reason to think that the countess wanted the power of observation or thought, but it is evident that she had only the very humblest object in view in keeping a diary, — that she aimed at nothing more than providing a slight assistance for her memory.

It seems further that, when she had anything of great importance to record, she often abstained from doing so. There was one moment in her life when she was of real importance in Prussian history. This was in the last months of 1808, when the French army of occupation was on the point of leaving Prussia, and Napoleon was forcing a new treaty upon the king, by which he hoped to hold Prussia down as effectually as if his army were not withdrawn. A great outcry was raised about the conspiracies against the French power, which were supposed to be rife among the Prussian officials and military men. Davoust and Daru took the lead in the agitation, and the servile French party among the Prussians, which had its headquarters at Berlin, echoed all their charges. One of the absurd stories they circulated was that the Countess Voss had written a letter to Prince Wittgenstein, then at Hamburg, proposing to him to poison Napoleon at Bayonne. The prince was actually arrested on this charge. About the same time, we find the leading statesmen of Prussia complaining that it is impossible to keep important state secrets because of the countess Voss's *teas*, at which everything was repeated. These are not matters of the first importance, but they are, at least, more important than nine-tenths of the matters dealt with in this diary, and any information the countess might give about them would be of some interest to students of Prussian history, particularly as it would be certainly authentic. But we are disappointed; the diary contains not a syllable on these subjects, nor has the editor any light to throw upon them.

If a reader is very anxious to realize to himself exactly how the royal family of Prussia lived in that distressful period after Jena which was passed at Memel, he should take this book and compare it with the diaries of Sir George Jackson (of which the last volumes are called "The Bath Archives"). He will find in the one book that the countess met Mr. Jackson, and in the other that Mr. Jackson met the countess. For all we know, he may be able to find two histories of the same evening in the two books. We must add, however, that in all probability neither history will be worth reading, though the English diarist is in every case to be preferred. The diary before us at any rate can serve no better purpose than is served by a visitors' book at an inn. The utmost you can look for is to find what persons were to be met with at the Prussian court at a given time. In turning over so many names, however, something will occasionally strike the eye. For instance, in the later years of Frederic the Great, the countess often mentions a Humboldt among those at court. This we take to be the father of the illustrious brothers.

We have been speaking of the staple of the book, than which nothing can be more unprofitable. There are, however, three passages in it which are more interesting. Of these the first is that part of the diary which refers to the last years of the Seven Years' War. As the editor says, there is something startling and "almost enigmatical" in the style of these pages, which show us "how, at the very time when the king, overwhelmed with losses and misfortunes of every kind, struggles all the more heroically against the enemy's superior force, people at the court of his wife, sisters, and sisters-in-law were trying to drive away the time with petty amusements, and scarcely troubled themselves seriously to know what territory of the miserable and exhausted land was at the moment groaning under the heavy hand of the Russians, Austrians, or French!" Besides the curiousness of this, these pages give us a more distinct notion than perhaps it was possible to get before of one who certainly is among the most unimportant personages in history, but yet a queen, and the queen of a great king; we mean Elizabeth Christine, the neglected wife of Frederic the Great. Her impatience and dogmatism, her want of tact in conversation, are traits which we think are new: —

> The queen was present, too, and made some very angry remarks about the unfavorable accounts and reports that were circulated about her court. I do not know what she can mean but some silly gossip here in the place, which should not have been listened to, and still less noticed. But she would not leave off scolding and declaiming that the people who received from her the greatest attentions were loudest in mocking and ridiculing her; in short, I am sorry to say she said a number of things which put us all into perplexity, and were very little becoming in a queen.

The other two interesting things in the book are the two parallel love-stories — that between the heroine and Frederic's brother, Prince August Wilhelm, and that between her niece Julie and King Frederic William the Second. In the history of the Hohenzollern house, these two stories are really not unimportant, and the more so because they run parallel to each other. In both cases, the lady is pursued with the most ungovernable passion. In the first case, she makes her escape from the royal addresses by a marriage without affection; in the latter case she yields. But both the lovers, at the time of falling in love, bear the title of Prince of Prussia, and one is the father of the other. King Frederic William the Second is a person who, as soon as it becomes part of a proper English education to learn something about Continental, especially about Prussian history, will be recognized as having a great historical importance. His peculiar ungovernableness, his total want of the stern self-discipline which has made the greatness of his house, had great consequences in the world, for they produced that demoralization of the Prussian State and army which ended in Jena and the Peace of Tilsit. His character is the more worth studying because it was not without strong and remarkable qualities, so much so that Kant could describe him as a "brave, honest, humane, and — putting aside certain peculiarities of temperament — a thoroughly excellent prince." We seem to get some light upon his character from the way in which in this book it is set over against that of his unfortunate father. Ungovernableness is equally the characteristic of both father and son. The elder prince of Prussia, at the celebration of the marriage which he has forced our diarist into contracting, actually falls down in a fainting fit, and has to be carried out. The same unrestrained sensibility is shown in the circumstances of his death. In this volume is printed a letter from a Fräulein von Kleist, describing the persistency with which, when attacked by illness, he, broken-hearted by the harshness with which his brother treated him, refused to listen to medical advice or take remedies, until, in spite of all the care of those about him, he succeeded in rendering his illness fatal. The family likeness is plain in the notes which the diarist makes of the behavior of his son, Frederic's successor. He pursues Julie as his father had pursued our diarist, until she consents to a left-handed marriage, and, in the remarks here made, both on this persecution and on his other amours, we see how different was the Prussian Charles the Second from the English one. We see a man of passion rather than a man of pleasure, a sentimentalist rather than a cynic; that is, a man not wanting in the feelings so much as in the discipline of virtue.

Just so much we seem to learn from this book, though, indeed, it would not be safe to treat as serious historic testimony a document so exceedingly light and so conventional in its tone as the diary of the Countess Voss. But the time will come when King Frederic William the Second of Prussia — the king who made the treaty of Reichenbach, the second and third partitions of Poland, the invasion of France, and the treaty of Basle — will be a better-known historical character than he now is; and it will then be interesting to observe that the faults of his public career were of the same kind as those which were observed in his private life, that is, very great and scandalous faults, but not faults of will so much as of impulse, the irregularities of a warm temperament joined to a somewhat confused understanding.

From The Pall Mall Gazette.

THE AMERICAN SUMMER AND AMERICAN SOCIETY.

PHILADELPHIA, *August* 30.

ENGLISH visitors in Philadelphia this summer have experienced the feelings and have had the general appearance during the past month of those unfortunate Polar bears one sees now and then in a zoological garden. While enjoying the gentle pleasures of a spring and summer upon the Thames last year, I was constantly surprised by complaints of unusual heat, with the thermometer at a mild 75° or 80°. It seemed to me that the complainants hardly appreciated the climatic blessings of Providence in their own country, and that a visit to America in July and August would be an excellent experience for them. Some Englishmen have had this experience in the present season, and none who have, I think, will ever complain of the heat in England again. Even a residence in a warm southern latitude does not prepare a person for the discomforts of what is called a "heated term" in this country. There are no forewarnings of these terms; their coming is so uncertain that no efficient means in the way of appliances or build-

ings are taken to provide for them. The climatic relations of the American people are exactly the obverse of those of the Italian people. In Italy every preparation is made for summer and no preparation for winter; in America all the resources of architectural and mechanical ingenuity are turned to account for protection against a long season of frost and snow. In Italy a "cold snap" finds every one shivering and with no means of keeping warm; in America people can simply resign themselves to misery during a heated term. With the exception of the naturalized Germans, who have established a few beer-gardens in every large city, the Americans have not learned as yet to enjoy themselves in the open air like the people of the Continent.

The Americans know of only one means of making the summer heat endurable. This is to leave their homes and live in cottages or hotels by the seaside and in mountain resorts. The number of these places runs well up among the hundreds before those are exhausted which have either a State or a national reputation. Add to these the quiet, out-of-the-way nooks which a few families here and there have discovered, and the places of summer resort may be fairly called "innumerable." The few which are more or less known in England — as Saratoga, Long Branch, or Newport — occupy no such relative position in this country as do the great watering-places of England and the Continent in Europe. So many others dispute their precedence, or at least attract attention and patronage away from them, that none of them enjoys anything approaching a monopoly nor concentrates so much of the national wealth and fashion as to make it imposing like Brighton, or finished and attractive like Wiesbaden. Newport, perhaps, is as charming a resort, and as magnificently built up, according to the number of its summer population, as any in the world; but it is simply a distant suburb of New York, Boston, and Providence. Aside from the old commercial town of about ten thousand inhabitants, almost as venerable in its appearance as if it were a neighbor of Coventry, Newport is merely a city of private villas. Saratoga, on the contrary, is entirely devoted to transient guests drawn there by the temptations of a short fashionable season and the special attractions of two "racing weeks." The guest of an hotel in Newport has a doubtful social position, except so far as he may have personal friends among the "cottagers." The latter take absolute precedence, and the occupants of private lodging-houses rank next. At Saratoga the few dwellers in private cottages have no recognized existence, except as they appear at the hotels or attract the attention of hotel guests. At none of the American watering-places are there those distinctions of classes according to the season of the year which are characteristic of Brighton and Scarborough in England. There is only one season at any of them, and all kinds of visitors go at the same time. It would puzzle an English visitor, indeed, to see any lines of demarcation between the social "classes" as they gather at these resorts. No one can do so except a skilled American. In a country like this, where social classes have scarcely any basis except personal taste — where two or more classes may claim precedence, with no one to decide between them and with no recognized standard on which to found a decision — where no settled traditions exist and there are no letters patent from the government — where the term "good society" means nothing in particular and everything in general — it requires a very learned eye to mark the distinctions which really do exist. An English lady recently insisted, in conversation with myself, that class-distinctions were very decided in American society. She was right. But it is nevertheless true that neither she nor any other stranger has the slightest tangible means of learning what the distinctions are or where they begin and end. When our comic writer, Nasby, wrote a letter to show the advantages of the Alaskan climate, during our negotiations with Russia, he remarked that the isothermal line went "corkscrewing" up among the parallels of latitude, and that strawberries flourished all the year round on one side of it and icebergs on the other. The corkscrew may be taken as a fair illustration of the boundaries which mark the various classes of American society. If this is true even when society is at home, in our cities, the truth is more noticeable when all the elements of our society mingle together at a summer resort. Except so far as he depends on his letters of introduction, an English gentleman visiting one of them cannot do better than be guided by his personal taste in his judgment of the people he meets. If he is himself a man of refinement he may be tolerably certain, following this rule, that the people he likes best and becomes best acquainted with belong to "good society" in this country. If he is not himself re-

fined, he will select a very different kind of people, though he will feel quite as well satisfied, in the end, that he has been circulating among the best classes here. Those he meets, in fact, will constantly assure him to that effect. It is, or should be, a particular charm of American society that every foreigner, whomsoever he meets, feels confident that he has been in its highest circles.

A fact which is not generally known in England in connection with American society is this: whatever influence wealth, new or old, may have, culture is something which uniformly commands respect and a good position in all circles. It may be entirely overshadowed by the claims of wealth, through sheer force of superior numbers, in some places and among some classes; but it is everywhere recognized as a sufficient passport in itself to the highest social circle. This is quite as true of social life in a far-western city, where not one member of society in a hundred lays claim to a liberal education, as it is in the most exclusive circles of Boston, where culture claims an absolute monopoly — where it seems only to tolerate wealth, and to look with a complacently patronizing air upon "birth." On the other hand, there is no circle of American society in which many of its members do not owe their position to the possession of wealth. This must always be true of any society which is untrammelled by long-existing aristocratic traditions. The utmost exclusiveness to be found in Boston or Philadelphia, or among the "Knickerbocker" families of New York, yields to the power of wealth, where it is accompanied by a fair amount of good taste on the part of its possessors. Nor is it necessary that culture or any high degree of good taste should be possessed by the father and mother of a family. American society, however exclusive, is ever ready to assume that a man of wealth has struggled upward from a youth of scant advantages, and it is amply satisfied if he gives his children the opportunities of culture which he himself may have lacked. Men like this, in truth, are among the strongest supports of any American social circle, whatever or whoever its other members may be. A few practical hints, then, to an English gentleman coming to America might be given, as follows. Supposing him to be extending his acquaintance beyond the immediate limits of his personal letters, which can be done very readily at our summer resorts, if he meet people who have cultivation, but do not presume upon it or show too much evidence that they are conscious of possessing it, he may assume that they move in good circles, and he need not ask himself what profession or business the head of the family is engaged in. If he meet a family of which the younger members are truly refined — all marked assumption of refinement being barred — he need not trouble himself if the father be a plain or even rough business man. The mother will probably be a quiet-mannered and cultivated woman; if not the latter, she will be gentle and retiring, neither denying nor parading her lack of early advantages. Such a family, the visitor may feel almost certain, belongs to the "best circles" of its own neighborhood. The description will fit thousands of families in all parts of this country who hold unchallenged positions in the highest social ranks. Finally, if an English visitor fail to find any true refinement in a family, and nothing, at best, beyond a display of showy accomplishments, he need not deceive himself by any preconceived notions of the power of wealth in American society. Such a family does not move in the really good society here, and any opinions of American social life based upon the supposition that it does will be erroneous. However sensitive the people of a country may be to the criticisms of foreign visitors, it is the visitors themselves who are chiefly interested in the formation of correct views; and I give these simple hints for the benefit of those who must at best find American society, especially at its summer gathering-places, a very elaborate puzzle to comprehend. I would only suggest in addition that they remember that universal rule of all rules — every rule has its exceptions.

Whatever its future may be, and however grand a few of its hotels now are, Saratoga cannot, with all its reputation, be favorably compared with the equally celebrated resorts of Europe. One cause which has operated against it, and will continue to do so, is the tendency of all the great eastern cities to support summer resorts of their own, so to speak. Philadelphia, for instance, has built up, with the assistance of considerable national reputation which the place has lately acquired, the city of Cape May. This city is a conglomeration of huge wooden hotels, small boarding-houses, and private cottages, accommodating about twenty thousand visitors in all. Long Branch, about equally supported at present by Philadelphia and New York, though originally built up by New York, accommodates as

many more. The Delaware Water Gap, a mountain resort, and four or five other well-known places in my mind, all within easy reach of this city, have room for from twelve to fifteen thousand. Atlantic City will take another fifteen thousand. All these places are quite as apt to be full as Saratoga. During the present season visitors to the Centennial are running to and fro between these resorts and Philadelphia. To the English visitor desirous of seeing something of American society, a trip to any of them is exceedingly interesting; quite as interesting, perhaps, as what he may find at the exhibition. The "season" is at its height in the early days of August, and it continues for about six weeks longer. B. H.

From The Saturday Review.

THE LUXURY OF GRIEF.

MR. HERBERT SPENCER remarks, in his "Principles of Psychology," upon the indulgence generally known as the "luxury of grief," and otherwise called "self-pity." He offers an explanation of its meaning, but admits that his explanation does not completely satisfy himself. One explanation is, as he remarks, that, pity being in some sense an agreeable feeling, the pleasure remains even when we are ourselves the object of the emotion. This explanation, if partly sound, still leaves it to be explained why pity should be agreeable. We need not consider how Mr. Spencer accounts for this last phenomenon, as he offers a different account of the pleasure of "self-pity." He thinks that it may perhaps arise from a vague impression in the mind of the sufferer that he has received less than his deserts. It is natural, for example, to a rejected contributor to think that the editor must be stupid. By a natural association of ideas, he learns to dwell upon the fact of the rejection as illustrating the fact that he is not properly appreciated. Logically speaking, such a fact is hardly consolatory. The true conclusion is, "The world does not value me as it ought." The proposition confounded with it is, "I am worth more than the world thinks." If my own merits are taken as the starting-point, the opinion is painful; if the world's opinion is the starting-point, the opinion is pleasant. The bare fact, then, that a certain person does not do me justice can afford no legitimate ground for satisfaction; but when converted by an illogical process into a proof that I am worth more than that person thinks, it may be made to flatter that most illogical passion, my vanity.

The pleasure which people often take in contemplating injustice to themselves seems to show that this explanation is often correct. A pet grievance becomes a hobby with many men. In setting forth their grievance to the world, or even on brooding over it in solitude, they are necessarily dwelling upon their own virtues. And it is not surprising that, in many cases, the habit should generate an unreasonable self-complacency. We should doubt, however, whether this doctrine is wide enough to cover all cases. The most familiar examples of the "luxury of grief" seem to be but indirectly connected with any form of vanity. A sentimentalist takes a perverse pleasure in cultivating melancholy, after the fashion of Jaques, and delights in self-abasement and exaggeration of his own incapacity for action; or a widow cherishes her grief for a dead husband till she resents any attempts at comfort, and takes a pride in self-torture. In such cases, unfortunately familiar enough, it is often almost impossible to say what are the ultimate components of the passion. We have such marvellous skill in deceiving ourselves that nothing is more difficult than to give a fair account of our own emotions. The morbid recluse may be really nothing but a thoroughly indolent man, who dwells upon his weaknesses to excuse himself from action. Excessive grief for the dead easily connects itself with personal vanity. We are really seeking for the praise of constancy, or yielding to a sort of superstitious belief that the dead will take pleasure in our useless sacrifice of our own happiness. The play of motives is so intricate that the attempt to analyze them or sum up the result in a single formula is necessarily illusory. Much, therefore that passes for self-pity may be really some more intelligible passion in a metamorphic state.

The feeling, however, seems to be so distinct that we do not doubt its real existence. Without attempting a full explanation, or denying the validity of Mr. Spencer's explanation as far as it goes, we are inclined to ask the previous question, whether any logical explanation is to be expected. An emotion is something different from a belief, though the two are closely connected. Now the method applied by Mr. Spencer seems to assume that any emotion must have, so to speak, a given formula, and that, if this formula be contradictory, the emotion ought to be

impossible. In the case under consideration, the formula seems to be, "I am glad because I am sorry." That is manifestly absurd. A cause of sorrow cannot, as such, be a cause of pleasure. Therefore the luxury of grief implies a belief in contradictories. This is the perplexity. Let us see if it may not be diminished if we approach the subject from another side.

One of the most familiar symptoms of the state of mind in question is the feminine pleasure in crying. You cry, we are apt to say, because you are unhappy. How then can you find pleasure in crying? The answer would probably be that, although crying is caused by grief, it implies a transformation of grief which, at the moment, is agreeable. The mind has been in a state of tension, and the tension is relaxed when the tears come. The process is one of relief from a painful state of the system. Grief, like other emotions, swells and falls, as every one must have observed, in a series of waves. The passion gradually increases to a culminating point; then comes a period of relaxation during which it declines, and, by comparison, this period is agreeable. In men, and especially in women, of weak and irritable nerves, this second period announces itself by weeping. The stress of the torture is over; the tension is relieved by the discharge. The two periods are generally translated in terms of sentiment by a feeling of blank despair during the first period, implying a hopeless impulse to struggle against the inevitable, and, during the second period, by a sense of resignation or readiness to accept the position against which it is in vain to struggle. It is not surprising that, under certain circumstances, this latter period should be regarded as absolutely pleasant, and finally become an object of desire.

Still, it may be said, the feeling is obviously illogical. It is absurd to go up a mountain in order to have the pleasure of coming down, or to go through an illness in order to have the pleasure of convalescence. This is quite true, though we may suppose that, in morbid states of the organism, the illness partly loses its terrors, whilst the pleasure of recovery continues to be attractive. Nay, it is possible that there may be diseases which thus produce more pleasure than pain. The actual suffering may be small, and the pleasure of recovery great. Doubtless it is better to be healthy on any showing; nor do we assert that any such disease actually exists in fact. To suppose its existence, however, is not to accept a contradiction; and still less is it a contradiction to suppose a state of mind in which the pleasures of relief are more attractive in anticipation than the pains of the preliminary stage are repulsive. We assume, at worst, that people make a false calculation. The mind, for some reason, is so impressed by the equivocal charm of the melting mood that it anticipates a balance of pleasure, even when it has to pay the cost of the preliminary mood of congealment. Indulgence of the luxury of grief is in all cases objectionable, and indicative of some morbid tendency. But, admitting so much, it does not follow that it implies more than a very common error of judgment, or rather — for the word "judgment" implies too much conscious reasoning — of erroneous instinctive appreciation.

Nothing, of course, is commoner than the phenomenon so often remarked by moralists, that an immediate pleasure blinds us to the remoter consequences of pain. Every day thousands of men get drunk who know perfectly well that the pleasure will have to be atoned by pains incomparably worse than the momentary exhilaration. Why should not the reverse take place in some cases? The more distant pleasure, that is, may overbalance the nearer pain in its effect upon the imagination, if the pleasure has a specially attractive side to it and the pain is one which, for some reason, has ceased to be very repulsive. Most vices fortunately may be shown to involve bad reasoning, even upon the simplest utilitarian grounds; but, unfortunately, that does not prevent people from indulging in them. In the case we are considering the bad reasoning involved seems to be more palpable than in most others; but still, all that is implied is bad reasoning in the sense of erroneous calculation, not bad reasoning in the sense of consciously accepting a self-contradictory proposition. This last is the only kind of bad reasoning of which we can plausibly say that it is not constantly illustrated in the daily behavior of mankind.

After all that can be said, it must be admitted that there is a glaring absurdity in the desire for what can at most be described by the paradoxical phrase of a pleasurable kind of pain. We may observe, however, that in all such problems the view which identifies feeling with the implied logic is apt to lead us to palpable errors. It is a familiar argument, for example, with pessimists that life must be painful because all desire implies want. If I eat or drink it is because I am hungry

or thirsty. My action amounts to saying some different state is preferable to my present state. I wish for change, therefore I must be unhappy. All action means change; therefore all action springs from want of ease. We cannot examine the metaphysical groundwork of this argument; but it certainly contradicts the testimony of experience. Many states of desire are exquisitely pleasant. A good appetite is thoroughly agreeable so long as it does not pass beyond certain limits. We like to be hungry, and we enjoy satisfying our hunger. The system is stored with certain energies the exercise of which is a source of pleasure, perhaps the only source of pleasure, although the exercise implies a constant state of change. If this is admitted, whatever may be the ultimate explanation, it follows that the bare proof that a certain state of mind or body implies a desire for change does not make it illogical. The state, for example, in which grief passes into another form may be actually productive of a surplus of pleasure. The painful stage during which grief is, so to speak, accumulating within our system, may be a stage during which the grief is rather latent than overt. It exists, but it exists in such a way as not to impress our imagination. It is a dumb, inarticulate form, and therefore easily overlooked. The mood in which we accept the inevitable and derive a pleasure from abandonment to our impulses has, on the contrary, a conspicuous side which pleases the imagination in prospect, and in unhealthy states we commit the solecism of cultivating the grief in order to have the pleasure of relief from grief.

The cases, indeed, are rare, if they ever occur, in which a person would deliberately encounter sorrow in order to indulge the pleasure of weeping. The most ordinary case is that in which a person hugs a sorrow to his breast instead of seeking immediately for happiness. And in such a case, the true nature of the process is obscured by moral and æsthetic considerations. The indulgence in grief seems to be demanded as a proof of fidelity, or there is something shocking to the imagination in too speedy a transition from the mood of sorrow to the mood of happiness. We look at our own lives as we look at a tragedy. We are not pleased in the bare representation of suffering virtue; but we are impressed by the general harmony and beauty of the sentiment wrung from the martyr by his sufferings. We admire the actor who can thus set before us the very essence of a noble nature; and we are always tempted to become actors for our own edification. We see ourselves in imagination performing the part of tragic hero with unbounded applause; and feel that any cheerfulness, however pleasant for the moment, would produce a discord. Such a sentiment, possibly legitimate within certain limits, gradually initiates us in the habit of finding pleasure in melancholy; and in weak or morbid characters the habit gradually strengthens, and leads to the waste of life and the production of much vapid sentimentalism.

From Hardwicke's Science-Gossip.

EDIBLE AND POISONOUS FUNGI.

In several books certain general rules are given for ascertaining offhand whether a fungus may be eaten or not: they are so absurd, however, that botanists simply smile and never think of refuting them. Who originally drew up this code I do not know; but subsequent writers have copied it more or less implicitly. It is not exactly easy to see whether these rules are intended for the discrimination of the mushroom from other fungi, or edible from poisonous species generally. Perhaps the most important of these canons is, that edible species never change color when cut or bruised. We have seen how *A. arvensis* comports itself under such conditions! But there is a variety of *A. campestris* (var. *rufescens*, Berk.) which becomes brilliantly pink at the seat of injury; and this plant is one of the most savory forms of the mushroom we know. *A. rubescens*, P., assumes, as its name implies, a rufous tint, especially where it has been injured by insects. *Lactarius deliciosus*, Fr., turns from bright orange to a dirty green, and this alone is sufficient to distinguish it from all its compeers. The mere fact of a fungus changing color to blue cannot be regarded as an absolute proof of its toxic qualities, for a friend of ours has eaten *Boletus chrysenteron*, Fr., before he knew accurately *B. edulis*, Bul.; and during my noviciate I several times partook of *B. badius*, Fr., without any ill effects whatever accruing. Another rule very commonly relied on is, that if a fungus be pleasant to the taste, and its odor not offensive, it may be eaten. But this is not only a fallacious but an exceedingly dangerous guide. It is quite true some fungi are intensely acrid, and are irritant poisons; but, upon the other hand, *Lactarius deliciosus*, one of the

very best of our British species, as its name implies, when eaten raw causes a very unpleasant amount of tingling of the mouth and tongue. Far more important, however, is it to remember that a fungus may have a pleasant odor and taste, and yet be most virulently poisonous. Mr. W. G. Smith was poisoned by eating less than a quarter of an ounce of *A. fertitis*, P., which had anything but a disagreeable taste. Again *A. muscarius*, L. has no acridity, neither has *A. phalloides*, Fr., or *A. Mappa*, Batsch; and whatever may be the character of the two latter, the poisonous properties of the former are well known. It must be remembered that fungi may be irritant, narcotic, or narcoto-irritant poisons, and while it is possible to recognize an irritant by the taste, a narcotic may be nearly tasteless. There is one way, and only one, by which edible fungi can be discriminated from poisonous ones with absolute certainty, and that is by a knowledge of the individual species. As well might a code of rules be laid down for the discrimination of wholesome from poisonous fruits or vegetables, as for fungi. People do occasionally mistake aconite roots for horseradish, or fool's-parsley for parsley proper; but we have no general rules drawn up in this case, neither do people become panic-stricken and eschew the whole race of condiments because of these unfortunate accidents. But if any misadventure occurs from eating fungi, the whole race are scouted and branded as the harbingers of death. In this country fungus-eating is reserved for the few; but it by no means follows these few are experimentalists, far from it; for the species they eat have been known to be edible, and have been eaten, by the initiated, from time immemorial, in other lands if not in this. Like other kinds of food, they vary much in flavor, in the facility with which they can be digested, and in their nutritious qualities. Certain excellent species cannot be too widely known, and every housewife should be able to discriminate them, especially as they have all well-marked characters. Amongst these may be mentioned — *Agaricus procerus*, Scop.; *A. gambosus*, Fr.; *A. nebularis*, Batsch; *Lactarius deliciosus*, Fr.; *Coprinus comatus*, Fr.; *Cantharellus cibarius*, Fr.; *Hydnum repandum*, L.; *Boletus edulis*, Bul.; *Lycoperdon giganteum*, Batsch; and *Fistulina hepatica*, Fr. Occasionally we hear vegetarians say they live upon some fabulously small sum, — a few pence per diem; and although very few people, indeed, would care to debar themselves of wholesome nutritious food for the sake of a mere theory, yet it cannot be overlooked that the continued and continuing increase of the population will eventually demand a full development of the resources of the country. There cannot be a doubt that the esculent species of fungi will, in the future, occupy a most important place in the dietary of the nation, not simply because of their cheapness, but rather by reason of their nutritious qualities and the large proportion of nitrogenous compounds they contain.

From The Sunday Magazine.

GEORGE WHITEFIELD, THE FAMOUS PREACHER.

THIS man, who now saunters up to join the assembly, is of a very different type from the gentlemen of the court. His brow is knit; at intervals he murmurs some word to himself as if he wished not to forget it; something very like a proof-sheet is peeping out of his pocket. People stare at him, half with curiosity, half with wonder, as though they were surprised to see him here. David Hume has, in truth, not much time to spare from his history, but he cannot deny himself such an intellectual treat as listening to Whitefield. In and out among the well-dressed many there moves a crowd of people who wear neither silk nor velvet. There is the artisan, with his wife and children, who have come out here chiefly for the sake of the fresh, sweet country air; there are the city clerk and his sweetheart doing a little flirting to while away the time; there is the poor needle-woman, whose pale face has such a wistful look, that we fancy her heart must be beginning dimly to guess that if she could grasp the meaning of the great preacher's words, it might possibly bring into her life even more warmth and coloring than there is in the dresses she stitches for the grand ladies. Suddenly the murmur of voices which has been running through the vast assembly is hushed. The duchesses and countesses incline their heads a quarter of an inch forward; the fans of the actresses cease to flutter; the mass of the people make a little rush all in the same direction. Every eye is fixed on a man who is ascending slowly a green bank near at hand. At first sight there is nothing very remarkable in his appearance. His figure is tall and spare, his dress is homely; when he turns towards the audience we

see that he squints, and he has no especial beauty of feature. But the moment he begins to speak his face is forgotten in his voice. How does it thrill with holy passion as he tells of his dear Lord; how does it ring with stern indignation against sin, and yet how does it melt with tenderness over the sinner! It is so clear that it is heard at the further end of the wide assembly; and yet so sweet that music is the only word that can give an idea of its tones. His face, too, and his figure have changed since we last looked at him. Meaning has come into every movement of his hand; each feature answers to the theme that is upon his lips, as does the lake to the lights and shadows in the sky above; his form seems to have grown majestic, and to be like that of the desert preacher, or of him who cried against Nineveh. When he speaks of heaven, we almost believe that he has been there; when he tells of the Saviour's love and sufferings, it seems to us that he must have walked with Peter and John at his side; when he tells a story by way of illustration, as he often does, the description is so vivid that we listen breathlessly, as though we really saw the scene he paints with our bodily eyes. For two hours the tide of eloquence flows on unceasingly, and still the listening crowd remains enthralled. Different signs of emotion appear among them. The daughters of the people stand with clasped hands, looking up at the preacher as though he were an angel bringing them the good tidings which are the especial birthright of the toil-worn and weary; the actresses sob and faint; the great ladies actually sit upright to listen. The sterner sex, too, are affected in their own way. The hard faces of the mechanics work with unwonted feeling; the brow of Hume grows smooth; even Chesterfield, who hitherto has stood like a statue of one of his own ancestors, so far forgets himself when the preacher, in a lively parable, is describing a blind beggar on the edge of a precipice, as to start forward and murmur, "O save him, save him." No wonder they are thus moved, for the preacher himself sets them the example. Sometimes his voice trembles so much in his intense earnestness, that he can hardly go on; sometimes he even weeps. At length the sermon ends in a grand wave of heaven-aspiring prayer; then the crowd disperses, some to spend the night at a masquerade or at the gaming-table, some to criticise, some to forget, some to keep the good seed silently in their hearts.

From The Athenæum.

AN ANTIQUARY IN A DIFFICULTY.

WHEN Dr. Buckland was dean of Westminster, the lately deceased Dr. Rimbault applied to him for permission to make extracts from the registers of the Abbey, in order to ascertain the dates of admission, and of the decease, of some of the eminent men who had been on the establishment at Westminster. The difficulty which presented itself to the dean's mind was, that it would be too great a tax upon his own time to wait while the extracts were made, and that he could not give up the keys of the muniment-room to any person. Still he desired to oblige in all cases of literary research, and therefore offered to take Dr. Rimbault into the room, and to leave him there, to be let out at any appointed time. The proposal was particularly agreeable to Dr. Rimbault, as he could then work without interruption. Thinking that about three hours would suffice, and as he dined at an early hour, he appointed one o'clock. The dean was not punctual, and the doctor worked on. At three o'clock the latter felt the want of his dinner, his extracts were finished, and he wished only to be gone. "What could have detained the dean?" But no step was to be heard. The evening service soon began, and at length the last peal of the organ had faded away, and all was quiet. It then became evident that Dr. Rimbault was forgotten; and how long was this to last? Before daylight had quite passed away, he had surveyed his position, and found that he was in a trap from which it was impossible to extricate himself. He could neither scale the window nor make himself heard. He was quite at the mercy of the dean's memory; for he had not told any one where he was going, because he expected to return home within a few hours. "Would his disappearance be advertised, and would the dean see it, and when?" Dr. Rimbault had none of the bodily fat which is said to support life under long periods of fasting, and the last was, therefore, an important question with him. "When would the muniment-room be next visited?" That was, indeed, a remote contingency; so that, like Ginevra in the chest, which had closed over her with a spring lock, nothing but his skeleton might then be found. From these uncomfortable reflections Dr. Rimbault was released late at night. He had drawn together some parchments to recline upon, but not to sleep, when at last a key was heard in the door. The good dean had gone home to

dinner, and had taken his siesta; after which he commenced ruminating over the events of the day, and then at last thought of his prisoner! He returned to the Abbey at some inconvenience, and set him free with many apologies. Dr. Rimbault's ardor to be shut up in a muniment-room had then quite cooled.

From The Pall Mall Gazette.

AMERICAN "WATERING-PLACE' ACQUAINTANCE.

PHILADELPHIA, *Sept.* 4.

A STRIKING peculiarity of life at Cape May and Long Branch — and these places may be taken as illustrations of nearly all American resorts except Newport — is the general absence of even those slight distinctions which mark the various circles of society in the home cities of this country. This to a stranger is one of the most curious phases of summer life in America, and it cannot be understood by the application of any rules known to the society of England or the Continent. It is made possible by a single unwritten law of the American social code, which is universally recognized, and the authority of which is rarely, if ever questioned. An acquaintance formed at a watering-place involves no obligation of any kind after the end of the season. A lady may dance with a new acquaintance every evening for six weeks at Long Branch, and a slight passing bow in the street is all that the most stringent etiquette requires of her in New York or Philadelphia during the following winter. Even this is given more from that kindness on which all courtesy is based than because it is demanded by etiquette; and a gentleman is expected, like the ball-room acquaintance of a single evening in England, to await his recognition from the lady. This rule is so well established here that even such people as would like to disobey it and take advantage of an acquaintance formed at a summer resort are entirely overruled, and seem to be perfectly harmless. Under this law of the Medes and Persians — for such it has become — the most careful father or mother sees no danger in the formation of "promiscuous" acquaintances during the summer, so far as mere social entanglements are concerned. The only serious danger is of the kind which the otherwise harmless "detrimental" introduces into English society. A daughter may find herself interested in a young man of pleasing address and unexceptionable manners, whose character and resources are such that he would be anything but a desirable son-in-law. By the word "resources" is meant, in this connection and in this country, his ability to work successfully in business or a profession rather than the present possession of property. This danger, however, is one which is cheerfully and rather recklessly encountered. American parents seem indifferent, as a general rule, to the ancestral antecedents of their sons' or their daughters' future companions, and they are singularly ready to run grave risks, to say the least, as to their personal qualifications. There is little restriction, therefore, in the formation of new acquaintances at the summer resorts, and nearly any young gentleman of good manners appearing at one of them is taken up and utilized for the temporary uses of the dance and flirtation. In ninety-nine cases in a hundred he is laid aside again at the end of the season with quite as little ceremony. This process is constantly going on at all the seaside and mountain resorts. A stranger would hardly notice it at such crowded centres as Cape May and Long Branch. He would find many secluded circles, too, among the throngs at these places in which very "strict" ideas prevail. But these are mere eddies in the general current of American society. They represent no important class, and may be regarded as individuals only. At either of these resorts the stranger sees the result; he sees a great conglomerate social mass; but he would be confused if he attempted to learn how people have become acquainted with each other who had never met before; how the most intimate social relations have come to exist among utter strangers of the previous week. Let him go to the Delaware Water Gap, or Spring Lake, or Brynmaur, or any of the minor resorts within equally easy reach of Philadelphia, and he will understand the process in a day. He will see a young man arrive, for instance, at a small hotel in the afternoon, well dressed and of good manners. The new visitor will smoke a cigar, offer another gentleman a light, exchange a few words, drop into a chat — play a game of billiards, perhaps. There is dancing-music in the drawing-room during the evening. There are two, perhaps three, ladies for every gentleman. Sets are to be formed for a quadrille. The ladies' curiosity has already been piqued as to who the young stranger is, and what he is like. His cigar-acquaintance approaches him: "Dance? — good. By

the way, what did you say your name was? Oh, yes; I'll introduce you. Mr. ——, Miss ——." Where is papa? the English reader naturally asks; he is talking politics or business with a friend of two hours' standing on the piazza, and will probably go to bed at ten o'clock without disturbing the rest of the family. And mamma? She is sitting in a corner of the drawing-room chatting with another matron. It may or may not occur to her that she has never before seen the gentleman her daughter is dancing with. In any event, the evening is supposed to count only for itself, and the partner of the dance is a temporary convenience, having no necessary connection with any future social relations. As to the young man himself, he becomes one of the party from that moment, and is depended upon by the young ladies as an attendant in the drawing-room, on pleasure excursions, and at other times. By similar easy processes the acquaintances of families are brought about. A few words between the fathers or between the wives, a look and a smile between the daughters, and friendships warm enough for the purposes of summer society are formed at once. Personal congeniality is the only consideration among the ladies; politics and business are enough to interest the gentlemen in each other. All that we have thus seen in a small hotel goes on continually at Long Branch and Cape May, though the simple original processes are not so readily observed. The one thing that makes them possible, as I have said, is the universally recognized law, that "watering-place acquaintances" do not "count" after the season is over, except when both sides desire them to be permanent.

It is on account of this peculiar freedom of social intercourse, this temporary throwing off of restraints considered imperative at other seasons, that an American summer resort may be considered one of the pleasantest places in the world for the casual tourist. The way is even more open, if possible, to an English visitor than an American, the native ladies and gentlemen feeling a certain responsibility for the extension of hospitality; nor can any number of valuable letters take the place of the universal welcome — *pro tem.* — extended to the stranger. One young Englishman of my acquaintance, whose face and manners are in themselves a passport, surprised me the other evening at a summer hotel where we were remaining but a single day. We had arrived about two hours before, and were watching a few ladies and gentlemen who were dancing and chatting in the drawing-room. My companion left my side, addressed one of the ladies pleasantly but respectfully, seemed to enter into a conversation, and presently became her partner in a quadrille. When we afterwards met I asked him how he had managed to walk so quietly over the few impediments which even I had always found. "Oh," he answered, "I told her I was English and a great way from home, and had no acquaintances here — and she took me up in a matronly sort of way, as if she felt it her duty to make me as comfortable as possible. I often do that in America, you know, at a summer resort." This, of course, is an extreme case: it implies tact and a very respectful manner on the part of the gentleman; and it could only happen, among people that can be called members of good society here, at a small place where the dangers of imposition by adventurers could never occur to the mind, as at Cape May or Long Branch. While, however, the proceeding is more direct than an American gentleman could safely venture upon, and the lady's approval depends on a good-natured recognition of a stranger's position, it involves no social principle which is not recognized here in the summer season. Except among that "strict" few, representing no general class, to whom I have already referred, the ladies most likely to resent such a direct self-presentation on the part of a polite foreign gentleman belong to a lower rather than an upper order of American society — to that class who feel obliged to follow the "rules" of etiquette, without trusting themselves to make their own exceptions as circumstances may suggest. B. H.